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FRANK: G. RUFFIN, Editor. P. D. BERNARD, Proprietor.

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ANALYSES OF MARLS OF LOWER VIRGINIA,

AND SOME OF THE ACCOMPANYING EARTHS, SERVING AS MANURES.

BY PROFESSOR GILHAM.

[Published by order of the Executive Committee.]

To the Executive Committee of the Virginia State Agricultural Society:

Gentlemen,—It is a matter of no little surprise that, with all that has been written upon the subject of the marls, and other fertilizing earths, to be found in the tide water region of Virginia, so little should have been determined in relation to their composition. The deposites referred to, have been classified by geologists into Meiocene and Eocene marls, and Eocene green sands; the per centage of carbonate of lime has been determined in many cases, and published; statements have been made to the effect, that, like the green sand of New Jersey, our green sand contains large quantities of potassa; gypsum was known to be present in the green sand, and in some of the marls, and its per centage actually determined in several specimens of the former. But no complete analyses of any of these deposites were ever published, that I am aware of, until last year, when I reported the analysis of four specimens of marl in the Southern Planter. Since that time I have completed the examinations of a number of marls, several specimens of green sand, and as many samples of some earths which are associated with the marls, and which have been found to possess more or less value as manure.

When I commenced these examinations, it was for the simple purpose of ascertaining what the substances are, besides carbonate of lime, which, forming part of these marls, add so much to their fertilizing power, without attempting a determination of the amounts of these various substances; but while such an investigation was of some interest, no satisfactory comparisons could be made in relation to the relative merits of different specimens. This defect in the analysis having been pointed out to me, I undertook the tedious labor of determining the amounts of the various substances present, or at least of those which are in any degree fertilizing, and the following paper is the result of these labors.

Most of the specimens analyzed, and all of the more important ones, were taken from beds that have been long known, and extensively used, and their effects fully treated of in Mr. Edmund Ruffin's "Essay on Calcareous Manures." The specimens were, with one exception, very kindly selected at my request, by Edmund Ruffin, Esq. They were selected with great care, and may be said to be as fair average specimens of the various beds as could be obtained. I have not visited the deposites, but, through the kindness of Mr. Ruffin, who has furnished me with very full descriptions, referred me to his Essay for what may be wanting, and authorized me to draw from the Essay, I shall be enabled to furnish accurate descriptions of the marls and earths in question, and speak with certainty of their effects. I shall not enter into any details explanatory of the methods pursued in the analysis, nor shall I indulge in any speculations as to the general effects of marl upon soils; but will content myself with stating that the analyses have been performed with great care, and that every precaution was taken to insure accuracy, and present the analyses themselves, as the strongest argument that I could adduce in favor of a far more extended use of these manures.

There is an important geological difference between the Eocene and Meiocene formations, but such differences would be of little practical importance to the agriculturist, if it were not, as will appear before the close of this paper, that there are striking differences in the composition

of the marls and earths found in the two. In order to make the differences between specimens from the same formation more apparent, I shall present their composition in tabular form; and that the characteristic differences between the marls, and other earths of the two formations, may be seen at a glance, I shall introduce a number of separate tables.

EOCENE MARLS.

The following table embraces the results obtained in the analysis of six specimens of Eocene marl:

Number.	Locality.	Carbonate of Lime.	Sulphate of Lime.	Bisulphuret of Iron.	Potassa.	Soda.	Phosphoric Acid.	Alumina and Oxyde of Iron.	Organic Matter and Water.	Silica.	Chloride of Sodium.	Ammonia in the Organic Matter.	Additional Sulphate of Lime, from the Bisulph. of Iron.
1	Coggin's Point - - -	39.879	1 987	0	0.801	0.336	trace	7.177	4 920	39.547	0.209	0.100	0
2	C. Braxton's, Pamunkey	35.891	0.858	1.450	0.924	0.201	*	7.307	4.300	*	0	*	3.286
3	Carter Braxton's - -	31.195	0.231	1.946	0.612	1 002	*	*	*	*	0	*	4.406
4	Marlbourne - - - -	28 858	0.482	1.446	1.142	0.016	trace	*	4.560	*	0	*	3 259
5	Whiting's Swamp -	12 554	0.813	8.753	2.030	0.064	0.120	10.180	5.450	*	0	0.036	0
6	Malvern Hills - - -	9.862	1.635	2.623	2.549	0.074	trace	15.780	5.090	*	0	*	5.942

Wherever the figure 0 occurs it is an indication of the total absence of the substance, and where the mark * occurs it indicates that the proportion of the body was not found.

No. 1 was selected from under the high promontory of Coggin's Point, Pr. George county, south side of James river. The thickness here varies from four to eight feet. This bed is now known to extend over an area of some twelve miles in length from east to west, and from eight to ten in width, and is exposed to view in many places within its boundaries. Throughout this entire area, the marl preserves a remarkable uniformity in appearance, texture, and no doubt in chemical composition also. The bed varies from four to ten feet in thickness. The general and almost uniform color is pale buff, or dingy yellow; the shells are almost all in a disintegrated state, leaving the marl in a fine state of division, and scarcely distinguishable from barren subsoils, or clay river cliffs. There is scarcely any visible green sand, but when the calcareous matter is removed by hydrochloric acid (muriatic acid), this earth is found in a finely divided state, mixed with common silicious sand. Two thin, but continuous layers of almost stony hardness, extend through the whole bed; these layers are nothing more than bands of marl, that have been cemented by carbonate of lime deposited from water. They contain more of the calcareous principle than the thicker and softer marl, from which the specimen No. 1 was taken; but in other respects I find their composition very much the same as the softer marl. The specimen analyzed by me seems to be poorer, at least in the proportion of carbonate of lime, than the general average of the bed, but the results obtained, if possessed of any value, will not be the less valuable on that account. For a full description of this marl, I refer my readers to page 450 and following of the 5th edition of Mr. Ruffin's "Essay on Calcareous Manures;" an account of some of its effects will be found in Chapter XVI. of the same Essay.

Mr. Ruffin was the first to discover and use this marl; he soon observed in it a superiority over the ordinary meiocene marls, and attributed its superior effects to sulphate of lime, which he inferred was present in small quantity, and says that "subsequent agricultural practice has supplied the confirmation." He also speaks of "some kind of saline matter which cattle are fond of licking (believed to be sulphate of alumina) and some amount of the granules of green sand;" and adds that "all these additional ingredients together do not seem to me sufficient to account for the superiority of this marl." By reference to the analysis it will be seen, in the first place, that the sulphate of lime, or dry gypsum, is nearly two per cent., a proportion which would make the per centage equivalent to something *more* than two per cent. of common gypsum, which always contains a definite proportion of water; secondly, the green sand is in sufficient quantity to furnish no little potassa, and some soda; and thirdly, the organic matter, as shown by the analysis, is capable of furnishing very considerable ammonia. The substance which attracts cattle is, without doubt, the chloride of sodium, (common salt,) which appears to be peculiar to this marl.

The great value of this marl as a manure has been tested by a number of far-

mers; its use, however, has been abandoned, for the most part, on account of the difficulties in excavating it, and the distance that it has to be transported, and stone lime has been substituted in its stead. Mr. Ruffin in speaking of its effects, and without any definite knowledge of its composition, beyond the proportion of carbonate of lime, deprecates its abandonment, and recommends its use instead of lime, even at the present cheap rates of the latter article; supported by my analysis, I would most unhesitatingly recommend the use of the marl instead of lime, whenever the *equivalent* of lime can be had from the marl at any thing like the cost of lime. In manuring with lime, the effects may be, and no doubt are, almost immediate, but whether heavy doses of lime, without other additions, are permanently beneficial, is a question; with the marl, however, there can be no question, we have the lime to perform the same part that it would if stone lime were applied, and in addition, we have almost every thing else required to make the poorest lands productive.

No. 2 was selected from the middle, and most compact stratum, of the richest upper layers of the Pamunkey "green sand" marl. The stratum referred to is marked 4 in the diagram on page 484 of the 5th edition of the Essay on Calcareous Manures. The place from which it was taken, is Newcastle, the farm of Carter Braxton, Esq. of Hanover. This bed furnished the greater part of the marl employed by Mr. Ruffin in his extensive marlings, (previous to 1852,) at Marlbourne, his present residence.

It is unnecessary to say any thing in relation to the agricultural value of this marl. The great value of this and the other Pamunkey marls has long been known to the people of the State through Mr. Ruffin, and the analysis now comes in, to furnish us with a satisfactory explanation of their superior effects. There is one point, however, that it may be well to advert to, and that is the occurrence of gypsum and the bisulphuret of iron in this and the other Eocene deposites. In the original deposition of these beds there is no doubt that there were very considerable amounts of the bisulphuret of iron deposited with the green sand, calcareous, and other matters present, but that gypsum was entirely wanting. As soon, however, as the beds of marl, &c. were raised out of the water, by which they became exposed more or less to the action of the air, the oxydation of the sulphur and the iron of the sulphuret set in. Sulphate of the oxyde of iron was thus formed, which meeting with lime, was decomposed, with the formation of sulphate of lime, or gypsum. In this bed, and in all the others, except No. 1, this process is still going on; in No. 1 the process is complete. Now since gypsum is slightly soluble in water, it sometimes happens that it is removed almost as fast as it is formed, so that a final exhaustion of the sulphuret takes place, without there being a corresponding amount of gypsum left. But when the marl is placed upon the land the oxydation is, of course, much more rapid, and very little, if any, of the gypsum formed, is lost to the soil; so that in estimating the value of the marl, we are safe in assuming that the soil will receive the benefit of an additional amount of gypsum, equal to that which can be produced by the complete oxydation of the sulphuret of iron contained in the marl. The last column in the table shows what the additional per centage of gypsum would be in each case.

No. 3 is from the same locality as No. 2, and the same bed, but from a lower level; it is somewhat mixed with the true green sand, or "gypseous earth," which underlies it.

No. 4 is a mixed specimen from Marlbourne, the farm of Edmund Ruffin, Esq. The beds of marl and other associated earths, were reached by deep boring, at a point on the farm about one and a half miles to the south of the Pamunkey river, and about the same distance from the locality of Nos. 2 and 3.

After passing the surface and subsoil, the first deposite is a fine, compact, blue clay, which becomes intermixed with sand as it descends; this bed is six feet in thickness.

The next bed of four feet, is the "olive earth," which immediately overlies all the eocene marls of this vicinity.

Immediately below this earth are found the calcareous, or true marl beds, which have an aggregate thickness of eight feet. These beds appear to be identical in appearance, alternation of strata, &c. with the Pamunkey beds from which Nos. 2 and 3 were selected; hence an analysis of an average sample of the Marlbourne beds may be taken as a pretty fair representation of the average value of the Pamunkey beds also. These beds rest upon the green sand.

I have executed analyses of all these

beds, but for the present, I confine myself to the calcareous ones; in other places I will speak of the others.

Ten different specimens were taken from the different strata of the marl, a specimen for each foot in going down, until the eighth foot was reached, and from this last foot three samples were selected. Equal parts of the first seven samples were mixed in a mortar with an eighth part, which was composed of equal quantities of the last three samples, and this mixture was taken for the analysis No. 4. Hence this analysis may be assumed to express the *average* value of the entire bed of marl, from the "olive earth" above, to the green sand, or "gypseous earth," below.

No. 5 was made up (as an average sample of the whole) from three different layers, of different appearance, in the same bed; the three making a thickness of eight feet. It is from Whiting's swamp, on Retreat farm in Hanover; is about one and a half miles from the Pamunkey river, and about seven from the last mentioned locality. This body of marl was not used, or even discovered until within a few years; but since has been applied extensively on several neighboring farms, and with effects apparently equal to any known marl. That it should prove very valuable as a manure is not at all surprising, for while in this marl the per centage of carbonate of lime is small, a defect easily remedied by heavy doses, we have abundant supplies of almost every other mineral fertilizer. The proportion of sulphuret of iron is very remarkable, indeed much larger than I have found in any other marl or green sand; the continued action of the air upon this substance must produce large quantities of gypsum in every soil to which it is applied.

No. 6 is from the Malvern Hills farm, the property of B. F. Dew, Esq. near the James river, in the lower part of Henrico. We have as yet no reports of its effects as a manure; we may safely predict, however, what they will be when made, for in composition it is not inferior to the best Pamunkey marls.

In Nos. 2 and 3 the phosphoric acid is marked as not determined; it is proper to remark that in the qualitative examination I found a minute quantity of this acid, but in the quantitative analysis made no effort to ascertain the amount.

In two instances I have stated the proportion of ammonia; there is a small quantity of it in all of the others, and its amount can be determined with as much certainty as any of the other constituents. This ammonia is undoubtedly derived from the organic matter present in the marl, which is of animal origin.

MEIOCENE MARLS.

In the following table we have the results obtained in the analysis of five specimens of meiocene marl. To prevent any confusion in the references, I have numbered them in the same series with the eocene specimens:

Number.	Locality.	Carbonate of Lime.	Sulphate of Lime.	Bisulphuret of Iron.	Potassa.	Soda.	Phosphoric Acid.	Alumina and Oxyde of Iron.	Organic Matter and Water.	Silica.	Ammonia in Organic Matter.	Additional Sulphate of Lime.
7	South Field, Coggin's - -	45 289	0.122	trace	0.207	0.090	0.051	2 990	3.910	44 520	*	0
8	Finney's, Coggin's - - -	31.522	0	0	0.202	*	0.114	2.670	*	62.200	*	0
9	Coggin's Point farm - -	46.595	0	0	0.244	0.166	0.025	3 990	6.740	38.200	0.062	0
10	J. C. Ruffin's, Prince George	34 130	0	0	0.263	0.103	0.019	3 510	5.630	54.180	*	0
11	Hooper's, King William -	62 065	0	0	0 1	39	*	2 376	2.750	23.630	*	0

No. 7 is from South Field, Coggin's Point farm. It is a compact blue marl, containing many whole shells, and large pieces, which are hard; it is wet in the bed. Some hundreds of acres have been manured with this marl, a single excavation supplying the whole. It was the marl used in Experiments 6 and 7 in Chapter XII.; 14 and 15 in Chapter XIV. and 16 in Chapter XV. of the "Essay on Calcareous Manures."

No. 8 is from a different locality (Finney's field,) of the same farm; it is yellowish, dry in the bed, very sandy, and not compact. The shells are whole, or in large pieces, but soft. This marl was used in Experiment 10, Chapter XIII. of the Essay on Calcareous Manures; it extends for some miles up the river, and every where rests upon green sand, (or "gypseous earth.")

No. 9 is described as a rich, dry, yellow marl. The shells are generally reduced to small particles, caused by the former violent action of the waters. This marl has been extensively used, and was the

one applied in Experiments 4, Chapter XI. and 11 and 13 in Chapter XIII. of the Essay.

No. 10 is from the farm of Julian C. Ruffin in Prince George, four miles south of James river. The specimen analyzed was taken from the second layer of marl, and about five feet from the surface of the bed. The marls from this locality have been used to cover the whole of the arable land on the farm, and with good effects.

No. 11 was taken from Hooper's, King William county, five miles from the Pamunkey. The bed lies high, and is dry; in color it is yellowish white. This marl was used to some extent by the late Gen. Corbin Braxton.

In one of these marls only, I have determined the proportion of ammonia; they all, however, contain small amounts of this substance.

A comparison of the numbers in the above table with each other, or of the numbers in the first table, will show that there are considerable differences in the compositions of marls from the same formation; but that these differences result from varying proportions in the different bodies found present, rather than from variations in the bodies themselves. If, however, we compare the numbers of the two tables, marked differences are exhibited, not only in the proportions of the various substances, but there are fertilizing substances found in one which cannot be found in the other, and the proportions of some of those which are common to both, are in the one case sufficient to affect the value of the marls materially, while in the other their per centage is too small to produce appreciable effects. By comparing the numbers in the two tables which express the proportions of carbonate of lime, it appears that, as a *general* thing, there is more of this principle in the meiocene than in the eocene marls; but when we come to a comparison of the other columns of the two tables we find deficiencies in the meiocene that more than counterbalance the benefits resulting from this excess of carbonate of lime. First, we find but one specimen of meiocene marl to contain any gypsum, and in this the proportion is entirely too small to be of much service. Secondly, this one specimen contains a trace only of bisulphuret of iron, while all the others are perfectly destitute of it; hence these marls contain no provision for the formation of gypsum, while all the eocene specimens, except one, do. Thirdly, while the meiocene, as well as the eocene, contain both potassa and soda, the proportions in the meiocene are always much smaller than in the other.

In order to make the difference in these marls more apparent, and at the same time to give persons interested in the subject, some idea of the quantities of the various other fertilizing substances found with the carbonate of lime, I subjoin the following table. The calculations are based upon the supposition that a bushel of dry marl weighs 80 lbs.—an estimate which cannot be far from the truth. The first column exhibits the number of bushels, of each marl, that must be applied, to furnish 100 bushels of carbonate of lime; the other columns give the number of pounds of the other principal substances contained in the number of bushels opposite them in the first column. The last column contains the numbers expressive of the quantities of dry gypsum that would be produced (in addition) by the oxydation of the bisulphuret of iron contained in the eocene specimens.

Number.	No. of bushels of Marl necessary to yield 100 of Carbonate of Lime.	Number of pounds of Sulphate of Lime.	Number of pounds of Potassa.	Number of pounds of Soda.	Number of pounds of Phosphoric Acid.	Number of pounds of Ammonia.	Number of pounds the additional Gypsum.
1	250	400	160	*	0	20	0
2	280	190	200	*	*	*	730
3	320	57	150	200	*	*	1100
4	315	133	316	*	0	*	900
5	790	500	1280	*	75	23	several tons
6	1000	1300	2000	59	0	*	4750
7	220	21!	36!	15	9	*	0
8	315	0	50	*	29	*	0
9	215	0	42	28	5	11	0
10	295	0	63	24	4	*	0
11	160	0	1	7	*	*	0

The great difference between the marls of the two formations became manifest in my qualitative examinations, and the quantitative analysis only served to make it more apparent. Not wishing, however, to draw a general conclusion from the analysis of so limited a number of specimens, I have examined a number of other specimens from both formations; and although I have not gone through the great labor attendant upon the quantitative analysis of them all, I have satisfied myself that the distinguishing characters of the marls from the eocene and meiocene formations, as exhibited by the analysis of the above specimens, are general, for all the marls of that portion of Tide Water Virginia from which they were taken.

Both these formations, containing extensive beds of marl, are spread out over wide areas, and beds of marl are to be met with far remote from the localities which furnished the specimens I am discussing; hence we cannot, from the above examples, say with certainty that the peculiar characters of each formation continue the same throughout—this is a point yet to be determined.

I have not spoken of the value placed upon these marls by those who have used them most extensively, as the principal part of what I have to say in relation to them must necessarily flow from the analyses themselves. It may not be amiss, however, to remark that Mr. E. Ruffin, who has given the subject more attention than any other individual, very soon observed marked differences in the effects of marls from the two formations; and while he thoroughly appreciates the value of the meiocene marls, he now invariably estimates their practical value by the per centage of carbonate of lime they contain.

GREEN SANDS.

The well-known value of the green sands of New Jersey has led many to suppose that the green sands of Virginia must be of great agricultural value also. In appearance, in geological position, and in effects, however, the two deposites are very unlike, and the results that I have obtained, establish the fact that in chemical composition they also differ. The New Jersey green sand is a deposite belonging to the upper secondary formation, while the Virginia green sand belongs to the eocene tertiary. The latter deposite is frequently associated with marl, and underlying the marl wherever the two are found together; sometimes the beds of "green sand" marl insensibly run into beds of true green sand. It is invariably composed of a mixture of fine silicious sand, and a peculiar dark green earth, which, of course, gives the whole mass the green color from which it gets its name. The bisulphuret of iron is invariably present also, and must have been derived from the same rocks which furnished the granules of green sand. I have analyzed four samples of this substance; a sufficient number, I think, when taken in connection with the green sand marls, which only differ from the true green sands in containing carbonate of lime, to enable us to arrive at correct conclusions in relation to their practical value. The following table contains my results; the samples are numbered continuously with the marls:

Number.	Locality.	Carbonate of Lime.	Sulphate of Lime.	Bisulphuret of Iron.	Potassa.	Soda.	Alumina and Oxyde of Iron.	Phosphoric Acid.	Organic Matter and Water.	Silica.	Additional Sulphate of Lime.
12	River bank, Pamunkey, - - -	0.804	0.301	0.802	3.217	1.220	*	*	6.160	*	2.055
13	Coggin's Point, - - - - - - -	1.284	2 006	1.851	2.960	0.177	18 000	*	6.750	65 290	4.192
14	Marlbourne, - - - - - - - -	6.784	0 223	2.150	0.839	0.043	6 050	trace	3.460	*	4.871
15	Coggin's Point, - - - - - - -	trace	0 986	3.591	3.126	*	19.300	*	*	*	*

No. 12 is from Marlbourne farm, and was taken from the Pamunkey river bank, (at only a few inches deep from the before exposed outside,) and at about the ordinary level of the river. It belongs to the highest stratum, or layer, of the beds marked 3 in the diagram on page 484 of Mr. Ruffin's "Essay on Calcareous Manures." The earth from this bed, and from the lower ones, which present the same general appearance for some miles above, has been used on several other farms, with different degrees of moderate benefit.

No. 13 is from Coggin's Point on James river. It is very dark colored, and nearly black when moist, as it is in its bed. It is the same kind (although not from the same locality) as the layers marked D and de-

scribed at page 465 of the Essay, and also Nos. 1 and 3 on page 472. See general description on page 454 and following.

No. 14 is from the same pit on the Marlbourne farm that No. 4 was taken from, and is intended as an average sample of the first three feet of green sand, or "gypseous earth," below the marl. A large quantity of this earth was taken, including a little of the marl of the bed above, which had filled former natural cavities, in the upper green sand; and after proper mixing, a small portion of it was taken for analysis.

No. 15 is from the same beds with No. 13, but a different locality. Both have been used as manure to great extent, and with as much as any usual effects. (See "Essay on Calcareous Manures," pages 472–4, of like earth, there marked D, and 1, 2 and 3.)

It has long been known that these deposites contained gypsum, and the sulphuret of iron, and the proportions of these substances were determined in several instances by Professor Shepherd of New Haven, whose report upon the subject will be found on page 469 of the Essay so often referred to. It is asserted in that report that Professor Rogers had found as much as ten per cent. of potassa in these sands, and the belief is, I believe, general, that our green sands contain as much of that substance as those of New Jersey. It will be seen, by reference to my results, that there must be very few samples indeed of this deposite which contain any thing like ten per cent. of potassa; on the contrary, almost all of them must fall far short of it, for two of the specimens that I have analyzed were from localities which are regarded as furnishing very rich samples of the earth—not so rich in the sulphate of lime, but rich in the granules of "green sand," the substance which supplies the potassa. By reference to the numbers of the above table, it will be seen that *in not a single instance*, not even in No. 14, which contains six per cent. of carbonate of lime, *is there as much as ten per cent. of fertilizing matter;* and even when we take into the account the additional sulphate of lime, which would result from the oxydation of the sulphuret of iron, supposing the soil capable of supplying the necessary lime, the entire fertilizing matter in the Virginia green sand may be put down as *a little less than ten per cent.* This is exclusive of the organic matter, which in a dressing of 40 bushels to the acre, (the quantity usually applied on the Coggin's Point farm,) would scarcely exert an appreciable influence.

The experience of those who have used this substance as manure is nearly such as we should expect from its composition; its action as a manure is fully discussed on pages 458 and 9 of Mr. Ruffin's Essay. In a letter to me on the subject, Mr. Ruffin says, "Some of these (referring to the green sands, or 'gypseous earths,') have proved beneficial in a remarkable degree, but on clover almost exclusively, and the effects disappearing before any subsequent crop, whether of grain, or the renewal of clover in the next course of the rotation." Again, he says, "this earth, (on the Pamunkey,) has been used extensively as manure, (and under the name of 'marl,') and with more or less benefit generally—though in some cases, in other localities, to but little, if any, profit;" and again, "In our use (on Coggin's farm,) we have *generally* found it beneficial on clover, on calcareous (or marled) land *only*, and that for a short time usually."

It is well known that the much greater number of soils of Tide Water Virginia are not productive without the aid of lime, either as caustic lime, or the carbonate, and in considerable quantities; now the green sands are deficient in lime, and hence when they are applied to land that has not had previous applications of lime or marl, no beneficial results can follow. No application of one or more fertilizers to the soil will make it productive so long as there is a deficiency in any one important principle, such as lime. Again, when this manure is applied to land already calcareous, the sulphuric acid formed, will immediately attack the lime, and form gypsum; but if the soil is deficient in lime, it follows that the sulphate of iron (copperas) will be formed, which is injurious to plants in a high degree. This salt is very soluble, and may not remain long in the soil, still the sulphuric acid will be lost, and the manure diminished in value.

The benefits of this manure being confined almost exclusively to clover, &c. we must look to the gypsum already in the manure, and to that which is formed after its application, as the principal fertilizer; and in estimating its value, experience would teach us to be governed by the proportion of gypsum, without reference to other substances. But I am not prepared to admit that the addition of so much of the alkalies, potassa and soda, has no bene-

ficial effect. That their effects are very limited, and almost inappreciable at first, is undoubted, but that is no bar to their future action. The gypsum in these sands is in an exceedingly fine state of division, and acts just as rapidly as the best ground plaster; but the potassa and soda are locked up, as it were, in the particles of green sand, and are useless to the soil and to vegetation until the granules of green earth are decomposed. Now the green sand of New Jersey readily yields to surrounding influences, and the beneficial effects of the liberated alkali are soon felt; but with our green sands the decomposition may, and most probably does, go on very slow indeed, so much so as to lead to the impression that the potassa and soda present are of no benefit to the manure, and unless it should turn out that the soils of lower Virginia are, in their natural state, abundantly supplied with the alkalies, I should be disposed to attribute their apparent non action in the green sand to this cause.

The fact that it requires so little green sand, 40 bushels to the acre, (see page 460 Essay,) to produce the maximum effect, and that its effects are of a very transient nature, establish two points in relation to the bisulphuret of iron in the earth: first that the sulphuret must supply an additional quantity of gypsum, otherwise the dressings must be heavier; and secondly, that the oxydation of the sulphuret, and the consequent formation of gypsum must be a rapid process, so as to be completed, probably within a few months after the application of the manure to the soil.

By reference to the table containing the analyses of the eocene marls, it will be seen that, leaving out the carbonate of lime, there is a remarkable similarity in composition between these marls and the green sands. It follows from this that little benefit is to be derived from applications of green sand with eocene marl, provided the latter has been applied in sufficient quantity; but wherever meiocene marl or stone lime are applied, we may expect the same effects to follow the application of green sand with either, as would follow from an application of the best eocene marl.

The following table, calculated upon the supposition that a bushel of green sand weighs ninety pounds, will give some idea of the fertilizing matter contained in one hundred bushels of the earth, a quantity which is more than what is usually regarded as the application necessary to produce maximum effects on land already made calcareous:

Number.	Bushels.	Sulphate of Lime, in pounds.	Potassa, in pounds.	Soda, in pounds.	Additional Sulphate of Lime, in pounds.
12	100	28	288	100	185
13	100	180	266	16	375
14	100	20	7	*	435

It is to be remarked in relation to No. 12 that the sulphate of lime is most probably very much less than in those parts of the bed which are not exposed; it will be remembered that this specimen was taken from the Pamunkey river bank, and on a level with the surface of the water.

"OLIVE," AND OTHER EARTHS OF THE EOCENE FORMATION.

In the course of my examinations of marls and green sands, I have had occasion to analyze several of the earths which overlie all the eocene marls of that portion of Virginia from which the specimens that I have been discussing were taken; and as I consider the results obtained as of some importance I take the liberty of laying their analysis before the Society. Up to the time that I made application to Mr. Ruffin for specimens of marl for analysis very little, if any, attention had been paid to these earths, as they were regarded as perfectly valueless for manure. Mr. Ruffin, however, sent me a small sample, with the remark that it was "supposed not to be worth applying as manure." I had the curiosity to examine the specimen slightly, found it to contain gypsum and the bisulphuret of iron, and announced the fact to Mr. Ruffin. Some months later he informed me that some experiments had been

made with the "olive earth" of the bed on Retreat farm. and that it had been found beneficial to clover in a remarkahle degree. He then sent me several specimens for analysis; the results will be found in the following table:

Number.	Locality.	Carbonate of Lime.	Sulphate of Lime.	Bisulphuret of Iron.	Potassa.	Soda.	Phosphoric Acid.	Alumina and Oxyde of Iron.	Organic Matter and Water.	Silica.	Ammonia from the Organic Matter	Additional Sulphate of Lime.
16	New diggings, Marlbourne	traces	1.409	1.499	0.465	*	0.069	*	6.130	*	0.125!	1.970
17	New diggings, Marlbourne	traces	0.573	0.643	0 226	0 140	1.178!	9.230	*	*	0.046	1.453
18	Retreat farm - - - -	traces	1 256	1.565	0 453	0.079	trace	5.400	4 490	*	*	3.478
19	Retreat farm, lower bed	traces	0.859	0.693	0.324	0.087	0.269	7.460	5.250	*	*	1.576
20	Newcastle - - - - -	*	0.934	0.495	2 097	*	*	14.310	*	74 480	*	1.074

No. 16 is the fine blue clay, which constitutes the first layer met with in digging for marl at Marlbourne farm. It is described in the account that is given of the beds which are associated with No. 4. Its thickness is about six feet. The specimen is mixed of equal quantities of several taken at two feet deep and at five feet.

No. 17 is from the same locality with No. 16, and lies between No. 16 and the marl from which No. 4 was selected. The bed is about four feet thick. This is the "olive earth" which overlies the eocene marl of this region. This specimen is coarser and more sandy in its character than they usually are. Full descriptions of the "olive earths" will be found on page 478 and following of the Essay on Calcareous Manures. The sample was made up of equal proportions of several parcels taken at the height of 6 to 12 inches from the bottom of the "olive earth," and of others at 18 to 24 inches.

Nos. 18 and 19 are "olive earths" which overlie marl No. 5, from Whiting's swamp, Retreat farm, Hanover. The two beds have an average thickness of four feet, and contain more clay than the Marlbourne specimen. These earths were used together as manure, and found to produce effects upon clover which were greater than any known of the best marl. See page 480 Essay on Calcareous Manures.

No. 20 is another specimen from Newcastle on the Pamunkey.

In the analysis of these earths I, in all cases, determined the proportion of sulphuric acid, and from that estimated the per centage of sulphate of lime that would result. Since, however, these earths contain but little lime, it is probable that the sulphuric acid is divided between lime, alumina and the oxyde of iron; but the ultimate effects will be the same as if it was all sulphate of lime in all cases when the earth is applied to land which is already calcareous.

As in the other cases, I subjoin a table showing how much of each fertilizing constituent is added for every dressing of 400 bushels, the quantity that was applied to the acre in the experiments above referred to as made with these earths, (of the bed at Retreat,) and with such remarkable effect:

Number.	Number of bushels.	Sulphate of Lime, in pounds.	Potassa, in pounds.	Soda, in pounds.	Phosphoric Acid, in pounds.	Ammonia, in pounds.	Additional Gypsum from the Sulphuret, in pounds.
16	400	500	165	*	25	45!	700
17	400	205	80	50	424!	15	525
18	400	400	144	*	*	*	1100
19	400	265	100	30	85	*	560
20	400	336	755	*	*	*	385

After what has heen said in relation to the marls and green sands, little need be said concerning these earths; a simple inspection of the table containing the analyses and of the above table will show that they are well worth attention as manures; and a comparison of these tables with the corresponding tables under the head of green sands, will enable any one to form as correct an estimate of their relative value as I could give him. There are two points which merit attention, the occurrence of such a quantity of ammonia in the blue clay in No. 16, and of phosphoric acid in No. 17. I was led to expect the presence of more ammonia in this clay than in any of the other beds, from the well known power of clay to retain this substance. It is true, that even in this case the per centage is very small, but in the application of four hundred bushels of the earth, even this small proportion *will give almost as much ammonia as would be supplied by three hundred pounds of Peru-*

vian guano. The "olive earth," No. 19, contains more phosphoric acid than any of the marls, and this taken in connection with the fact that the "olive earth," No. 17, contains more than one per cent. of this acid, would lead to the inference that these beds, as a general thing, contain more of the phosphates than any of the others that have been discussed.

In order to illustrate the peculiar value of some of these earths I close my remarks upon them with an example. Let us suppose that, instead of confining ourselves to the use of one of the manures, an application be made of equal parts of two of them, and let the two be Nos. 16 and 17. Let us also suppose the dressing to be four hundred bushels to the acre; then we shall have 350 *lbs. of gypsum*, 120 *of potassa*, 244 *of phosphoric acid*, 30 *of ammonia*. and in addition, the bisulphuret of iron will yield 600 *lbs. more gypsum*—where such a manure can be had guano will scarcely be required.

Respectfully your obedient servant,

WILLIAM GILHAM.

Virginia Military Institute, Feb. 15, 1853.

For the Southern Planter.

CORN.

PREPARATION OF LAND, MANURING, PLANTING, WORKING, SECURING AND USING THE CROP.

Mr. Editor,—Corn land should be well and deeply broken. We can, with a three-horse plough and a subsoil coulter, with a trident at bottom, six inches wide behind and two inches in front, break flats from sixteen to eighteen inches; and high land, free from stone, thirteen to fifteen inches; some favorable spots, more. In less than twenty years our ploughs and fixtures will be considered antediluvian, so great is the annual improvement in husbandry.

Time for Ploughing.—Part of the land, say one third, should be ploughed in December or January; one-third in February and March; one-third last March and first April. This will not answer well on red or very stiff land, for the reasons that all friable land will bring as good corn broken in April, as before, and half the work is saved, land less liable to wash, and brings a better wheat crop.

Manuring and Planting.—There is great diversity of opinion on these, as on most subjects. My plan is to make such a quantity of manure that we are hauling out whenever an opportunity may offer; a part is ploughed in, and as much put on afterwards as can be hauled out by planting time; then we begin manuring the grass fields for future crops, which is my favorite mode. Use plaster freely.

We lay off with a two-horse shovel plough on high land; the object being to get the grain deep into the land, and yet not have it covered more than two or three inches; then the field may be worked to a level. Never hill up and leave the land in ridges, it is no better for corn and much worse for small grain. Drop from three to four grains in a place, for fear of cut worms and other pests. Thin out to one or two, as it is to be left, early; late thining is injurious. Put the best hands to droping, and cover with a new-ground coulter; one lick will answer if the land be in good order; if not, run two.

Moist and rich alluvion land should be planted about double as thick as is usual, or more than that. I usually plant my flats four feet by eighteen inches, two stalks to the hill, but think the largest crop ever raised on this place was planted three feet by from six to eight inches. It was submerged in mud in November. Four feet by eight inches, one stalk to the hill, will make a fine crop on No. 1 flats, all things coming well in.

High Land.—I made, in 1850, a fine crop on rich high land, planted the best of it four feet by eighteen inches, one and two stalks, alternately; balance of the field, four and a half feet and eighteen to twenty inches, one stalk. The distance must be regulated according to the strength of the land. No field unable to bring corn five feet by two, one stalk, is worth cultivating.

Cultivation.—There is no need of a plough or coulter in the cultivation of corn, except on new land, or in very wet seasons, when grass has taken possession. In ordinary seasons it is easier to keep grass under than to *get it under.* We use the side wipe—three teeth, made after the fashion of a bull-tongue, fixed a foot long below the break, at an angle of forty-five degrees, to the beam—handles as to a shovel plough—break two feet eight inches long. Twice or thrice going over will do, two strokes at each time; chop out with hoe and thin; chop over after the last working. The best crops I ever made, had but four strokes in each row. Twenty-five or thirty years ago corn was ploughed four or five times, four or five strokes in each row. We can beat our ancestors making corn on the land they left exhausted.

Gathering.—Many persons pull fodder and cut tops. Do so when you will, and the corn is more injured than the fodder is worth. To strip a stalk naked in hot August weather is *barbarous;* 'tis not so cruel as was the treatment of Regulus, but is decidedly behind the age.

Cut your corn off near the ground just about fodder gathering time; haul it to some spot near your barn or farm pen on twenty feet logs fastened over the axle of an ox cart, or fore wheels of a wagon; put two inch pins through the logs and chain them down; have

six feet standards near the ground—pack on from two to two and a half barrels, drive up, take out standards, give a push, drive off, and your load is in place, ready to be set up in piles of half a barrel, at first, to one or one and a half barrels, later; tie with splits or grape vines, and you have the best long food I ever used, until May.

Horses should be fed on chop, two-thirds meal and one-third wheat bran. This idea was taken from Mr. E. Porter, in 1834, and is good: corn stalks and wheat straw, the long food; chaff or cut straw to mix on *wet* or *dry*. Beeves will do well on crushed corn, cob and all, alternated with pure meal mixed, occasionally as for horses—rough food the same.

Your friend,

W. W. Gilmer.

Ivy Creek, March 16, 1853.

For the Southern Planter.

CULTURE OF THE IRISH POTATO.

To the President of the Farmers' Club of Nottoway:

Dear Sir,—By request of several members of your body I hereby communicate to you the result of some experiments made by me, the present year, in the culture of the Irish potato.

The piece of ground, a light, sandy soil, of medium fertility, contained 1595 square yards, rather less than one-third of an acre. For several years it had been used as a grazing lot, and was pretty well sodded with common yard grass. About the first of March it was well broken up with a two-horse plough, and subsoiled to the depth of about 10 inches. The first of May, just before planting, there were applied to it 16 horse-cart loads of manure from the stable and cow-yard, part of it fresh and part thoroughly rotted. The manure was harrowed in and thoroughly incorporated with the soil. The patch was then laid off in rows, 3 feet apart—29 in all—55 yards long. Eight rows were made up in hills, 3 feet apart, such as you would make for tobacco. Eight were thrown up lightly with a single plough, and planted in the drill. Five were left level and covered over after planting with oak leaves. The first week in June, one month after the first plantining, the remaing 8 rows were ploughed and planted, with slips drawn promiscuously from the patch. With the exception of one row planted with fine large potatoes, the patch was planted with cuttings from potatoes of ordinary size, or very small tubers dropped whole. Except the row planted with large potatoes, which received but a single one to a hill, there were two pieces dropped in each hill. In the drill they were dropped about 10 inches apart; and so in the trash bed. The slips, too, were set about the same distance. The trash bed received no cultivation after planting, the leaves being applied immediately. Pine leaves or straw would have been better, not being so liable to be blown away. The bed suffered some from that cause. The hilled and drilled parts of the patch received three workings with the plough and hoe. The slips received but two workings, they being set a month later than the first planting. The plough used was Watt's Cuff and Brace Double Coulter, the best implement I have ever seen for cultivating root crops, or corn in the early stage of its growth. In working with the hoe care was used not to draw the earth either to or from the vines, but to leave it as at planting. I have noticed that drawing the earth to the vines causes fresh tubers to put out; but these cannot attain much size, and they obstruct the growth of those previously formed. The potatoes are such as I have been raising for several years. In shape and flavor they resemble the Mercer potato, with a thin reddish skin, inside very white. They were sent me a few years since by my father-in-law, Col. James M'Clanahan of Roanoke county. They are known in that region as the Bent Mountain potato. They are not a very early potato, but keep remarkably well, and are best for winter use.

The soil, as I thought, being of suitable texture, the ground being well prepared, well manured and well worked to the last, I expected a heavy yield. The result, however, exceeded my expectations. The potatoes were dug about the middle of October, and measured (the measure being slightly heaped) 135 bushels, at the rate of about 500 bushels to the acre. In assorting them, they were divided into three parcels, averaging respectively about the size of goose, hen and partridge eggs. The annexed table exhibits the relative and total yield of the several parts of the patch, both as to quality and quantity:

Rows—How Planted.	First Quality.	Second Quality.	Third Quality.	Total.
8 rows planted in hills -	16 bushels 2 pecks	6 bus. 3 pecks	2 bus. 2 pecks	25 bus. 3 pecks.
8 rows planted in drills -	20 bushels	20 bus.	4 bus.	44 bus.
8 rows planted with slips	24 bushels	6 bus.	2 bus.	32 bus.
5 rows planted in trash beds	21 bushels 1 peck	5 bus.	1 bus. 1 peck	27 bus. 2 pecks.
Gleaned after digging -	2 bushels	2 bus.	1 bus. 3 pecks	
	83 bushels 3 pecks	39 bus. 3 pecks	11 bus. 2 pecks	135 bushels.

The above table exhibits a very striking difference of yield, both in quality and quantity, resulting from difference of treatment. For convenience of reference we will indicate the several parts of the patch in the order they stand in the table by the Nos. 1, 2, 3 and 4.

No. 4, be it remembered, contains only 5 rows, while each of the others contain 8. For the sake of accurate comparison, let us suppose it equal in size with the other. Divide its product by 5 and you find the yield of a single row, which multiply by 8 and you have the yield of 8 rows as follows:

Rows—how planted.	1st quality.	2d quality.	3d quality.	Total.
8 rows in trash bed	34 bushels	8 bushels	2 bushels	44 bushels.

Assuming this as the product of No. 4, instead of that which appears in the first table, and comparing respectively the entire products of the several parts, we find No. 2 and No. 4 to be exactly equal, and each showing an excess of 19 bushels and 1 peck over No. 1, and an excess of 12 bushels over No. 3. No. 3 gives an excess of 7 bushels over No. 1. But there is another point of much importance to be noticed in the comparison. More than half the potatoes of No. 2 are of the second and third qualities, while the other three parts show a very small proportion of inferior potatoes. Thus No. 4 shows an excess in prime potatoes of 14 bushels over No. 2, though the entire product is the same. No. 3 gives an excess in prime potatoes of 4 bushels over No. 2, though in the entire product it does not equal No. 2 by 12 bushels. No. 1 also shows a large proportion of prime potatoes.

The result of these experiments is against cultivating potatoes in hills, and greatly in favor of raising them in trash beds. I do not suppose that the hill is really a disadvantage to the potatoes growing in it, but this mode of culture will not admit the potatoes being planted sufficiently close together to insure the largest yield. The drilled rows received nearly double the quantity of plantings as those in hills. The slip rows yielded well in prime potatoes, though the total yield was not so great as where the tubers were dropped. This method has the advantage of economy in seed potatoes. I do not think that drawing the slips injures the vines from which they are taken. Perhaps the best way to procure them, however, is to plant the potatoes in a hot bed, and draw the slips whenever they are of suitable size and there is a season for setting them out. They will live when the earth is but slightly moist. Heretofore I had not been favorable to the plan of covering over with trash after planting, and had never, until the past season, given it a fair trial. It was the name of the thing, (lazy bed,) given to it in this region, that prejudiced me against it. I regarded it only as an expedient to save a little work. I do not believe that generally there would be the same difference in favor of this method. In this case there was a combination of fortuitous circumstances. The ground was moist when the potatoes were planted; the trash was moist when put on; thus the bed was kept moist when the other parts of the patch were suffering from drought. If the trash were put on dry, and there should be no rain for a considerable time, I think the potatoes would fail to vegetate. Hereafter I shall be disposed to adopt the "lazy bed," not for the purpose of saving work, for, really, the labor of gathering, hauling and spreading the litter is about equal to two or three good workings with the plough and hoe, but for the following reasons: The potatoes may be planted in this way much nearer than when you have to cultivate them with the plough. If the rows had been only eighteen inches instead of three feet apart, the yield from the whole bed, I am satisfied, would have been much greater. I noticed that the vines on this part of the patch were not so exuberant as on the other. Again, the litter used as a covering is just so much manure to the land.

I will now give the result of another experiment made with three rows planted in hills: No. 1, planted with large potatoes, 1 in a hill. No. 2, planted with cuttings, 2 in a hill. No. 3, planted with small tubers, 2 in a hill.

	1st quality.	2d quality.	3d quality.	Totals.
No. 1	3 bushels 1 peck	3 pecks	1 peck	4 bushels 1 peck.
No. 2	2 bushels	1 bushel	1 peck	3 bushels 1 peck.
No. 3	1 bushel 3 pecks	3 pecks	2 pecks	3 bushels.

No. 1 shows an excess in prime potatoes of 1 bushel and 1 peck over No. 2, and an excess of 1 bushel and 2 pecks over No. 3, and in the entire product an excess of 1 bushel over No. 2, and an excess of 1 bushel and 1 peck over No. 3. The products of Nos. 2 and 3 are nearly the same, the difference being in favor of No. 2. The result is greatly in favor of planting the whole potato, and in favor of planting cuttings, rather than very small tubers. This is philosophical. It is reasonable to suppose that a large, plump potato would yield more than a small shrivelled one, on the principle that like produces like. We select our seed corn from the largest, fullest ears, and our seed wheat from the largest, fairest grains. Why not observe the same rule in selecting our seed potatoes?

Another thing to be considered. The young shoot feeds from the parent potato. You have noticed, perhaps, in digging that the parent tuber is generally entirely consumed, or, if it still remain, it is rotten, or else watery and lifeless. Its strength has been exhausted in nourishing its offspring. Now, the larger the parent tuber the greater the amount of nutri-

ment it will afford to the young tuber feeding from it. There can be but one objection to planting the large potatoes, and planting them whole, that is the larger quantity required to plant a given piece of ground. But if the above data be correct, the loss is more than made up in the increased product. Or if the potatoes must be cut up, I would, by all means, select the very best for the purpose. Eat the small potatoes, or feed them to your stock.

Now, sir, let me suggest a single inquiry. Why should the cities and towns of our State be dependent on the north for their supply of potatoes. There are very few Irish potatoes raised for market in Virginia. Many of our farmers do not raise enough for their own consumption. Some of the members of your Club, I am informed, bought northern potatoes last year, in Petersburg, at from one to two dollars per bushel, not a whit better, I will venture to say, than they might have raised, by a little pains, on their own lands.

In conclusion, sir, allow me to express my high approval of the objects and organization of your association. I have but little time to devote to agricultural pursuits, and I make no pretension to much knowledge or skill in farming. Yet, sir, I cannot but regard with lively interest the laudable, and I may add, the successful efforts of your Society to promote the cause of agriculture in our community. There is certainly much room for improvement, in all the various departments of our farming operations, not only in our own county, but throughout our Commonwealth, and it is with sincere gratification that I witness the well directed efforts of your own and similar associations to accomplish the needed reformation. Our farmers generally are not deficient in industry; they are not greatly deficient in intelligence, but they are *sadly*, *sadly* deficient in public spirit.

Yours, very respectfully,

THOMAS W. SYDNOR.

Nottoway, Dec. 23, 1852.

For the Southern Planter.

IS BARN YARD MANURE INDISPENSABLE TO THE PRESERVATION OF THE FERTILITY OF CULTIVATED LANDS?

This is an exceedingly interesting subject for the consideration of the practical farmer; and although I am perfectly aware that an attempt to answer this question in the negative must necessarily controvert the records of scientific agriculturists, as well as the received opinions of practical farmers, yet I think facts clearly demonstrate, not only that barn yard manure is not indispensable to the preservation of the fertility of the cultivated soil, but that even impoverished land may be made exceedingly fertile without the application of manure of any kind whatsoever.

All scientific agriculturists concur in the opinion that there exists in the soil previous to cultivation a principle of fertility, termed mould or humus, indispensable to the growth of all plants. To the presence of this substance is solely to be ascribed the dark, rich, pulverulent appearance which characterizes a fertile surface soil. Von Thaer says: "It affords food to organization; without it nothing material could have life, at least the most perfect animals and plants could not exist." This scientific truth is amply confirmed by the experience of the practical farmer; he knows that newly cleared lands are very fertile, producing abundant crops of any kind for many years without manure; nor does he learn to appreciate the value of manure until the soil becomes exhausted of this fertilizing substance.

The first settlers in Virginia, as well as in every other State, were taught by experience that a soil, rich in this fertilizing substance, was injured rather than benefited by the application of manure. Science and experience alike demonstrate the fact that manure is totally unnecessary to a soil rich in humus.

It must, then, be a subject of deep interest to the practical farmer to investigate the true nature of this indispensable fertilizing substance, and to ascertain the best method of restoring it to the exhausted soil.

In several of the numbers of "The Plough, Loom and Anvil," I have published the facts which induced the belief that this important fertilizing substance had been erroneously defined by scientific agriculturists. I will not now recapitulate those facts, but will merely remark, that a substance which can be readily formed in an impoverished soil totally independent of vegetable matter cannot be correctly defined to be "the residue of vegetable decomposition." Dr. Johnson remarks in relation to the improvement of the soil by laying down to grass, (Agricultural Chemistry, page 426,) "When thus ploughed out the surface soil upon old grass land is found to have undergone a remarkable alteration. When sown with grass seeds, it may have been a stiff more or less gray, blue, or yellow clay. When ploughed out it is a rich, brown, generally light and friable mould. Or when laid down it may have been a pale-colored, red, or yellow sand or vegetable loam. In this case the surface soil is still, when turned up, of a rich brown color. It is lighter only, and more sandy, than in the former case and rests upon a subsoil of sand or loam instead of one of clay. It is from the production of this change that the improvement caused by laying down to grass principally results. In what does this change consist? and how is it effected?"

Dr. Johnson here distinctly recognizes the fact, that the earth itself was changed in fertility, color and consistency, which, of necessity, implies a chemical change; and no one of the reasons which he assigns to account for the change explains the fact that the earth

itself experiences a similar change in locations where vegetation never could have existed.

This fifth reason contradicts the definition of Liebig that "woody fibre, in a state of decay, is the substance called humus." He says, "Another important agency also must not be overlooked. In grass lands insects, and especially earth worms, abound. These almost nightly ascend to the surface and throw out finely-divided earthy matter. On a close shaven lawn the quantity thus spread over the surface in a single night often appears surprising. In the lapse of years the accumulation of the soil from this cause must, on old pasture fields, be very great. It has often attracted the attention of practical men, and so striking has it appeared to some that they have been inclined to attribute to the slow but constant labor of these insects, the entire formation of the fertile surface soils over large tracts of country."

The observation and experience of practical farmers establish, beyond the possibility of a doubt, the important fact that if the surface of the earth be closely covered with any substance whatever, it becomes exceedingly fertile, no matter how poor originally, nor what the deficiency in its mineral constituents.

The farmer in the south finds that the pea vine imparts, in a few months, much fertility to the earth. In Italy the white supine, a bitter weed, in one year generates so much fertility in the soil as to cause it to produce two luxuriant crops of wheat. Von Thaer says, "The Italians call it a 'refreshing amelioration,' and even prefer it when there is a sufficiency of animal manure." And we find in a report to the Legislature of Maryland, by Dr. Higgins, State Chemist, a graphic description of the improvement of the land in Prince George's county, by the use of clover and plaster. He says, "Most abundant fields of corn and waving wheat, rich pastures of the finest clover and fields of tobacco now occupy what was once almost a desert waste. Calling to mind what the scene here once was and viewing it now, one might suppose that the former state of things was produced by war's desolation; the latter, by the benign influence of peace. That the first marked the path of a destroying angel, blighting all that it touched; the latter, the result of Mercy's goodness poured out with a lavish hand. The improvement has been made solely by the application of gypsum, crops of red clover, and more thorough cultivation than had been before practiced. The improvement by these means was not slow and gradual but sudden and almost instantaneous. I well remember large tracts of this land which a few years ago did not produce more than two or three barrels of corn to the acre, which has since produced from twelve to fourteen and sixteen barrels to the acre. A field near Davidsonville, which, previous to 1840, only produced about two barrels of corn to the acre, two years afterwards produced fifteen, no other means being used but a bushel or two of plaster to the acre, as I was informed by the unquestionable authority of its present owner, Mr. S. H. D. This increase of crop was produced solely by improved culture, plaster and clover."

The Doctor's ingenious explanation of the renovation of this soil by the decomposition of the plaster, is completely refuted by the simple fact, that if a portion of the same soil be closely covered with plank or straw for the same length of time it will invariably prove to be equally enriched. If this be true, the Doctor's sulphuric acid theory must share the fate of the ingenious speculations of the scientific Liebig. This account of the astonishing improvement of the soil by the use of clover and plaster is fully confirmed by the experience of all practical farmers, in every country propitious to the growth of clover, who rely solely upon its shade. The practical farmer who duly appreciates the fertilizing value of shade finds no difficulty in enriching his lands; it requires no scientific instruction to enable him to fertilize every acre which he may be able to cultivate. He need give himself no concern about the modus operandi of the shading substances. In a practical point of view it will be sufficient for him to understand that if he succeed in densely shading the surface of his fields he will certainly enrich them—and he will soon be taught by experience that "a refreshing amelioration" will always prove to be a much more valuable fertilizer than the best barn yard manure.

R. T. Baldwin.

PROPOSED TRIAL OF REAPING MACHINES.

Our correspondent will have seen the offer of Mr. Booth to have a trial and harvest dinner, &c. &c. at his residence in Nottoway, has been publicly made. As he insists on having it there, the State Society has not thought it necessary to interfere. But if Mr. Hussey chooses to accept Mr. M'Cormick's challenge, they can meet in other places just as well, and can have the trial at several different points.

We are glad to see that Mauny will be present with his machine, and are authorized by Mr. Booth to say that he will be glad to see every man who has a reaper that he wishes to exhibit.

Mr. Editor,—In the last number of my Southern Planter I observe the offer of R. Grigsby, Esq. of Rockbridge, and as I understand him to pledge, or "guarantee," C. H. M'Cormick to appear with his reaper "at Brandon, or any other place on James river,"

to "afford him a fair trial of his reaper in competition with Hussey and all others," at the beginning of next harvest—the trial to continue "two entire days at least." As a properly conducted contest of this kind will certainly lead to beneficial results to the agricultural public, by determining which is the best, and ultimately the *cheapest* implement for the farmer to purchase, I was pleased to see the offer from so responsible a source, and presume the pledge will certainly be made good. It will doubtless be accepted on the part of O. Hussey, as promptly as it is tendered, for I have never yet heard of *his* "backing out" from any challenge to meet rival reapers in the field. In the language of your correspondent, the "motto in his case is, fair play and the public good."

The contests for superiority in the limited harvest fields of England between these renowned champions, do not as yet appear to be conclusive, or to satisfy some in America. It was confidently expected by hundreds that the liberal offer of a premium of one hundred dollars by the Maryland State Agricultural Society would have induced the rivals to meet, in so peaceful a contest on the Eastern Shore of Maryland last harvest, and on one of the "fairest fields" in the Union to decide this long contested point; but after the most extended notice of the trial, in order to induce competition, Hussey alone, of the two, appeared on the ground and bore off the prize.

It surely could not be that *Virginia* feared the *impartiality* of a *Maryland* jury! and also, after the appointment of five additional judges, made at the written suggestion of C. H. M'C. and those, too, who had used, and given him certificates for his machine! [See American Farmer, numbers for May and June, 1852.]

I may observe *en passant*, that in a recent number of the Albany Cultivator, C. H. M'Cormick has given a challenge to the rival reapers of *Illinois* to meet him in *Virginia* at the ensuing harvest, and it has been boldly accepted by J. H. Mauny, one of the competitors at the late Geneva trials, New York.

Now if there is no backing out by any of the parties, (and I feel very confident, indeed am willing "to take the responsibility," and to "guarantee" there will be none on the part of O. Hussey,) this mooted question of supremacy may possibly soon be settled to the satisfaction of the public, if not to the inventors of the rival implements. The proposed exhibition certainly need not give any just cause for "partisan" feelings: nor will it, if entered into in a proper spirit, and conducted in a becoming manner. The public, not less than the manufacturers, are greatly interested in deciding the question. The implement is an expensive one to the farmer—and if the difference, or superiority, contended for by many, does exist, we should know which is entitled to the preference. So desirous am I to witness such an interesting exhibition—a triumph of the genius and skill of our countrymen, whether from the north or the south, in lightening the most severe labors of the husbandman—that nothing short of sickness or actual necessity will prevent my being present as a spectator.

Permit me to make a single suggestion. As R. G., the Editor and myself, have a common object in view—to bring about the proposed trial—do not confine it to "Brandon or any other place on James river." Let it be distinctly and clearly understood that the selection of the fields, duration of trial, and appointment of judges, be confided to the Executive Officers of the Virginia State Agricultural Society, and without interference in any way, "by either of the high contracting parties." They can also decide upon the "appropriate premium" to be awarded, as well as the "promise of a good harvest dinner"—two very good accompaniments. Each party to give written notice by the first day of May to F. G. Ruffin that he will be present and enter his reaper for full trial and competition. This is considered perfectly "fair on both sides," and without it, gentlemen from a distance would not be likely to attend, fearing some disappointment. No doubt is entertained that ample fields and liberal minds abound in Eastern Virginia to afford every desired facility to test the reapers and mowers, to the satisfaction of every practical

FARMER.

P. S.—My name is of course at the service of your respected correspondent, R. Grigsby, Esq. if desired.

VIRGINIA STATE AGRICULTURAL SOCIETY.

At a meeting of the Virginia State Agricultural Society, held in the Hall of the House of Delegates, on Thursday evening, the 10th of March, 1853:

The President, on assuming the duties of the office, unanimously conferred upon him in his absence by the last annual meeting, availed himself of this first suitable occasion to express to the Society in a neat and felicitous address his sense of obligation for the honor conferred upon him, and his readiness assiduously to devote whatever of talent or influence he might possess to the furtherance of the objects and accomplishment of the beneficent ends for which the Society was instituted.

Mr. Harvie, from the committee appointed by the Executive Committee to recommend resolutions for the adoption of the Society, reported the following, which were unanimously adopted, viz:

1. *Resolved*, That the Executive Committee recommend to the Society to hold an Agricultural Fair during the ensuing fall.

2. *Resolved*, That the Executive Committee confer with the Council of the city of Richmond, in order to procure from that body grounds for the Exhibition, and such other aids as the city may furnish.

3. *Resolved*, That the members of the Society be called on to guarantee or subscribe such amount as may be indispensable to hold the first fair.

4. *Resolved, as the sense of this Society*, That the cause of agriculture will be essentially promoted by the extension of pecuniary aid to it on the part of the Legislature.

Mr. B. J. Barbour, in compliance with the invitation of the Executive Committee, in a manner original, humorous and impressive, delivered a most interesting and able address.

Mr. J. Ravenscroft Jones, referring to the third resolution in the series adopted above and the necessity for an immediate response thereto, proposed, in behalf of his county, to become responsible for the payment of one hundred dollars, and invited the co-operation of other members with him in this plan for augmenting the resources of the Society, and thereupon the following paper was prepared and subscribed, as follows, viz:

We, whose names are hereto subscribed, do bind ourselves to be personally responsible to the Executive Committee of the Virginia State Agricultural Society for one hundred dollars, for and on behalf of our own counties respectively. Signed

J. Ravenscroft Jones and E. B. Jones, of Brunswick.

P. St. George Cocke, of Powhatan.

Lewis E. Harvie, of Amelia.

W. W. Gilmer, F. G. Ruffin, F. E. P. Carr, R. W. N. Noland, R. W. Anderson, W. L. Dabney, J. R. Woods, T. J. Randolph, R. Colston, of Albemarle.

E. F. Harrison, E. J. Harrison, Ambrose Ford, of Cumberland.

W. E. Martin, Jas. C. Gates, of Chesterfield.

E. P. White, Joseph Jesse, T. V. Kean, of Caroline.

P. M. Tabb, Jr. of Henrico.

W. B. Stanard, of Goochland.

Ed. Gresham, W. Boulware, B. F. Dew, S. S. Gresham, of King & Queen.

Richard Irby, T. H. Campbell, E. G. Booth, of Nottoway.

W. G. Crenshaw, B. J. Barbour, of Orange—$125.

T. J. Bland, of Prince George.

Charles Bruce, of Charlotte.

J. B. Stoval, Wm. H. Clarke, of Halifax.

Mr. Harvie, of Amelia, proposed to make one of twenty persons, who should, by the payment of twenty dollars, constitute themselves life members; and immediately eighteen subscribers were entered upon the list.

Resolved, That the thanks of the Society are hereby tendered to our President and to Mr. B. J. Barbour for the eloquent addresses delivered before us this evening, and that copies thereof be requested for publication.

Resolved, That the Executive Committee be authorized to confer with the City Council of other cities and towns, as well as that of the city of Richmond, to procure facilities and means for the fall exhibition.

On motion, *Resolved*, That the Society now adjourn to meet in this Hall to-morrow evening at half past 7 o'clock.

On Friday evening, the 11th of March, the Society met agreeably to adjournment, and were occupied until a late hour with conversational discussions, of a most interesting and instructive character, on manures, their preparation, protection and application, and on various other subjects of agricultural experience and practice.

And then the Society adjourned.

Ch. B. Williams, *Rec. Sec'y.*

ROTATION OF GARDEN CROPS.

Rotation of crops is equally important in the garden as on the farm. The English Gardener holds that the perennials—currants, gooseberries, raspberries and the like, should be rotated; that they should not hold one spot longer than twelve years, and should not be removed in less than three years. In all gardens, rotation in crops should be attended to if we would get a proper return for our labor. Good gardening requires that two crops of similar character should not follow each other. The cabbage plot, the beet bed, the carrots, the onions, &c. should alternate; neither of them should be planted upon the same piece of ground two successive years. It is well to keep all those vegetables like in nature together, viz. the legumes—beans and peas in one quarter; the brassica—cabbages and cauliflowers in a second quarter; the bulbous—onions and turnips in a third; the carrots, beets and parsnips in a fourth, &c. In this way they look better, and are more readily alternated. The following rotation in the garden is the one approved in England:

1. Broccoli, cabbage, cauliflowers and savoys.

2. Beans and peas.

3. Carrots, beets and parsnips.
4. Turnips, potatoes, onions and leeks.
5. Celery, endive and lettuce.

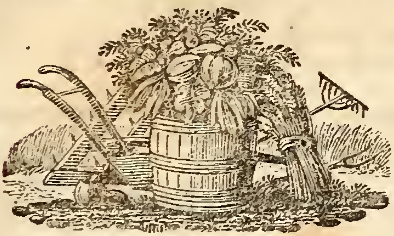
Celery is an excellent preparation for asparagus, onions and cauliflowers.

Turnips are a good preparation for cabbages and greens.

Cabbages are properly to be followed by beans and pears, onions and leeks.

Currants, gooseberries and raspberries prepare the ground well for potatoes, carrots, beets and parsnips.

Thus in gardening, it is all-important to keep up a "rotation of crops."



THE SOUTHERN PLANTER.

RICHMOND, APRIL, 1853.

TERMS.

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☞ No paper will be discontinued, until all arrearages are paid, except at the option of the Publisher.

☞ Office on Twelfth, between Main and Cary Streets.

All communications for the columns of this paper, and all letters of inquiry, to insure prompt attention, must be addressed to Frank: G. Ruffin, Shadwell, Albemarle County, Va.

All business letters connected with the Planter must be addressed to P. D. Bernard, Richmond, Virginia.

It is indispensably necessary that subscribers ordering a change, should say *from* what, *to* what post office they wish the alteration made. It will save time to us and lose none to them.

VIRGINIA STATE AGRICULTURAL SOCIETY.

In another column we give the proceedings of a general meeting of the State Agricultural Society held in this city on the 10th ultimo.

The object of the meeting was to make "one effort more for the cause of agriculture in Virginia"—to consult and determine upon the means best adapted to secure a respectable Cattle Show and Agricultural Fair next fall—for it had come to be almost universally conceded by the friends of agricultural improvement as vital and indispensable to the permanent existence of the Society that an exhibition of the kind should be no longer deferred.

The meeting was numerously attended from various sections of the State, and was animated by a zeal and enthusiasm such as we have not before witnessed on any similar occasion. Indeed the spirit manifested was such, as to give hopeful assurance that if "destiny and progress" are not words patented to the exclusive use of political nomenclature, our Society is destined to advance in an honorable careeer of usefulness which mark it as a harbinger of countless social blessings to the people and of prosperity, wealth and power to the State.

Ample means for defraying the expense deemed necessary for the success of the Fair were pledged on the spot, and we shall be most happy if the material which shall be brought together on the occasion shall equal the ability of the Society for the distribution of its premiums.

PRACTICAL VALUE OF THE ANALYSIS OF SOILS.

The old proverb that good wine needs no bush is a very good one, but limited in its application to those who are judges of the article. Hence it is necessary for us to introduce the following unpretending but able paper on the practical value of analysis of soils. In doing so, and commending it to the earnest attention of our readers, we think proper to inform them that we have taken pains to ascertain from a reliable source in Philadelphia, the city of his residence, and where he holds an important office in the assay department of the Mint, that "Professor Booth is an analyti-

cal chemist of established reputation, and is well known for the amount of accurate work he has performed in his line;" that "he is a conscientious and high minded man, and is actuated in what he has written upon the analysis of soils by an earnest desire to protect the farmer from imposition and disappointment, and his favorite science from being thereby brought into discredit." We have not ourselves exchanged a line with *him*, nor is he aware that we have taken the liberty to publish his essay.

In justice both to our own views and to those of Professor Booth and others like him, we beg leave to remark that to state the truth with regard to this branch of agricultural chemistry is not by any means to undervalue this budding science either as to present or anticipated results. And it will be observed that the author in the concluding paragraph of his paper speaks very confidently of the present advantages of analysis in a *scientific* point of view, and hopefully of its future *practical* usefulness.

His remarks of course do not include analyses made to ascertain the presence of a special ingredient,—lime for instance—which, along with one or two other substances, can be easily detected at slight cost; nor do they apply to certain gentlemen who have studiously and modestly avoided to charge full rates, finding their compensation, in great part, in the investigation of a cherished science. But they run full tilt against those pretenders, who, for the small sum of five dollars, offer to tell us all the elements of the land we cultivate, and to point out its deficiencies—a task, which faithfully executed, cannot in any case cost less than four times the sum; at least so we learn, at second hand, from a gentleman who, we have every reason to believe, is the best analytical chemist in the United States.

However unpleasant it may be, yet it is the duty of the editors of agricultural journals to tell the truth about these matters, even at the risk of being considered personal, and we are happy to see that the Pennsylvania Farm Journal, a very excellent and able paper, by the way, has, as will appear by referring to another part of this number, page , made a complete exposure of the ignorance of Prof. Mapes, one of the boldest of these cheap analysts.

A short time ago we told one of this class, who was exhibiting his terms to us, that no man could analyze a soil for five dollars. "Yes," replied he, lowering his tone, "I know that; but I make my money by charging twenty-five dollars for advice." "Falstaff's bill, again, thought we: 'to sack five pounds, to bread one penny.'" Why this indirection? It is always suspicious—like a letter we had some time since from a manure manufacturer, in which he informed us that he made nothing on gypsum, but sold it to protect the farmers from imposition! We put the letter by as a curiosity, and shortly afterwards heard one gentleman complain that he had bought thirty per cent. of water with his plaster.

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PRACTICAL VALUE OF THE ANALYSIS OF SOILS.

BY JAMES C. BOOTH.

[Read before the Philadelphia Society for the Promotion of Agriculture.]

Having followed the path pursued by many chemists in Europe and America, in analyzing soils, with a view to their bearing on the improvement of agriculture, I have become more and more convinced that chemistry has not yet advanced to such perfection that those analyses can have any immediate practical value. Having already dissuaded planters and farmers from having analyses of their soils executed under the expectation of an immediate benefit to be derived therefrom, and having freely expressed my views on the subject to members of the Agricultural Society of this city, I deem it advisable to present a concise expression of those views and my reasons for holding them, in order to prevent any misunderstanding as to their nature and scope.

As chemistry advanced in analytical accuracy and extent of application to physiology, so the examination of minute constituents in the soil has progressed, and their importance to agriculture urgently insisted on. But since the field has widened before us, we find that our first physiological conclusions were replaced by others, and these again by some still better grounded; from which we may fairly infer, that, although the science is progressing, it is still, as an art, of inferior practical value. The plain farmer, or even the en-

lightened agriculturist, cannot determine with rigid accuracy the exact amount of the constituents of a soil, and then proceed by weight and measure to apply the manures requisite to render that soil productive, because of the extreme difficulties attendant upon accurate analysis, and of our ignorance what precise individual constituent or constituents is requisite to impart fertility. If this cannot be done, the analysis of soils for immediate practical benefit is a manifest injury to the advance of the science of vegetable physiology, as well as of its application to agriculture, because the necessary ill success attendant upon the application of changing theory, will prejudice the mind of the practical man still further against the real value of theory, and eventually retard thereby the progress of true scientific agriculture. For this reason in particular, I propose to give my views, why the analysis of soils is at the present time of no immediate value to the farmer.

1. There is no little difficulty experienced by the chemist, in obtaining a fair average of a soil in any single locality, in order to subject it to analysis, because the uppermost part of a soil differs from that subjacent to it, by the intermixture of parts of plants and rootlets, and by the influence of greater culture, and of atmospheric agents. A very large majority of plain farmers would find a difficulty in doing that which would demand considerable care and skill on the part of the chemist or more enlightened agriculturist. It would be much more difficult to obtain an average sample of the soil of a whole field, because to the above difficulties is often added that of a variation of soil in proximate localities.

Doubtless, multiplied analyses of specimens from the same field might give us tolerably correct information in regard to the chemical composition of the soil, and these multiplied by the number of fields in a farm might enable us to form a fair opinion on the chemical character of the farm. But the difficulties of such analyses and their cost are serious objections, if there were no others, to their practical value to the farmer.

2. Of what value are detached analyses of soils, a hundred miles apart, compared with a thorough local investigation of the same soil under very different circumstances of culture? With his usual shrewdness, Berzelius led the way in such an investigation by analyzing elaborately a naturally fertile soil, taken from beneath the action of the plough, and the same soil from above the former, where it had been subjected to years of tillage. The differences were tolerably well marked, but since he did not present us with several analyses of each, we cannot certainly know whether culture alone had the effect indicated by his two single analyses. In a subject so little known and fraught with difficulty, such elaborate analyses, multiplied a thousand fold, in different localities, and under different circumstances, would establish theory on a firmer basis, and then allow of immediate practical benefit, but not till then.

3. The cost of analyses is a serious objection to their practical benefit. If it were only required to determine the amounts of silica, alumina, oxyde of iron, organic matter, and perhaps lime included, the analysis might be performed at a moderate cost, and the constitution of a whole farm determined; but the three first of these are precisely those which constitute the ground work or base of the soil, the mere solvent or diluent of the potential constituents. These last are determined with difficulty and at considerable cost of time, and since their accurate determination is necessary, the difficulty and expense of analysis increase in a greater ratio. Having stated that numerous accurate analyses would be necessary to ascertain the chemical constitution of a field or farm, it is evident that expense alone is an impassable bar at present to the wide spread application of the analysis of soils.

4. The difficulty and uncertainty attendant upon the analysis of soils that has any pretensions to accuracy, are such as to render it valueless. Those constituents believed to be of greatest value exist in exceeding minute quantity in soils, and in an ordinary analysis they are liable to be either left out or grossly exaggerated; in either of which cases the analysis is useless, because it tells an untruth, and forms an unsound, or rather wholly unreliable basis for calculation. Let us examine more narrowly how far what may be called a tolerably correct analysis may be relied on.

Alkali, lime, phosphoric, sulphuric and muriatic acids, ammonia and organic matter are generally regarded as the fertilizing constituents. Of these, sulphuric acid and lime (including magnesia,) may be determined with sufficient accuracy, especially lime, which is often present to the extent of several per cent. The exact determi-

nation of chlorine (or muriatic acid,) is often impeded from the accompanying organic matter, and the volatility of chlorides during evaporation. I would regard inferences drawn from the data, both of sulphuric and muriatic acids, as unsafe in sound farming practice. The precise amount of ammonia is ascertained with difficulty, and the amount given in analyses must be looked upon with some distrust, unless the quantity is unusually large—sufficient to overbalance the errors of analysis. We can ascertain with considerable nicety the amount of organic matter; but of what avail is that knowledge? Are the remaining, half decomposed rootlets and organized portions those which give fertility to a soil? or is it that very unknown humus body, soluble in alkali and reprecipitable by an acid? This last idea being as yet a mere conjecture, we may summarily dismiss the determination of organic matter, as of no immediate practical utility to the farmer.

Of all the minute constituents in a soil, alkali or potash and phosphoric acid are generally regarded as the greatest cause of fertility, and yet these two are precisely the most obstinate impediments to the accurate analysis of soils. Their precise estimation is attended with difficulty under nearly all circumstances, and peculiarly so, where their total amount falls below one per cent. as in soils. It may be fairly questioned whether the small fraction of a per cent. of phosphoric acid which is usually returned in soil analyses, may not often be due to errors of analysis, or be far above or below the true amount. I will assert that no accurate and candid chemist can declare with confidence and truth, that he has ever determined in a soil the exact amount of this pest of the analyst. Our means of determining it, when in conjunction with alumina, as it is most likely to be or to become in the analysis of soils, are still avowedly imperfect in the hands of the best analytical chemists. There is not much more confidence to be put in the precise estimation of potassa in very minute quantity.

It would appear then, that of all the fertilizing ingredients of a soil, lime can be estimated accurately, but that the precise amounts of the others cannot be given with confidence, while the determination of the most important is the least reliable of all. It is therefore not too strong a conclusion to say, that the present practical value of the analysis of soils consists in ascertaining how much lime they contain. Since inferior analyses have been left out of view altogether, and only what may be termed good analyses held under consideration, their uselessness or rather detriment to the farmer cannot be too strongly depicted.

5. There is a confirmatory argument against the practical value of soil analyses, which has been so clearly set forth by Major J. F. Lee, of Washington, that I take the liberty of quoting his letter to me on the subject. "We know that, on all poor land of proper texture, the application of 200 lbs. of guano to the acre will produce fair crops of grain and roots. And this is the difference between a barren and tolerably fertile soil. Now this guano applies only 6 lbs. potash, 24 lbs. phosphoric acid, and 34 lbs. ammonia. But the acre contains 2,920,000 lbs. of soil (to the depth of a foot.) Can analysis now, or will it in any progress we may reasonably expect it to make, ascertain one part of potash in 600,000 parts of foreign matter, or one part of phosphoric acid in 150,000 parts of foreign matter, or one part of ammonia in 100,000?" It may be answered without the slightest fear of contradiction, that such determinations are greatly beyond the present power of chemical analyses.—Whether they will continue so, I will presently inquire; but the argument is strong against the present value of analysis applied to soils.

6. Another, and I fear a greater objection to the immediate value of soil analyses, is the difficulty of ascertaining how much or what part of a soil should be analyzed. Soil consists of mineral and organic matter in a more or less comminuted state. Suppose that an ultimate analysis were made upon a fair average of soil, ground to the finest powder; would it express the fertile value of the soil during the time we look for remunerative crops? If, besides finely comminuted matter, it contained gravel or coarse sand, consisting of quartz, feldspar, greenstone, &c.; how long time will be required for the disintegration of the cohering mineral masses, so far as to allow plants to extract the alkali, &c. which they ask for? Even if we make a previous mechanical separation of the very fine from the coarse matter, and subject only the former to analysis, who would be so presumptuous as to predict how much of this fine matter would disintegrate and yield its rich stores to the husbandman in the course of one or more years, or even of a century? The farmer would doubtless

prefer knowing how much benefit he is to reap in his own lifetime, than to leave it to posterity in a future of uncertain length.

Guided by these considerations in the analysis of soil, I employed water, slightly acidulated with acid, to extract the fertilizing ingredients, supposing that my analysis would thereby express the now potential qualities of the soil. I am now, however, more thoroughly convinced that, in our present ignorance of the rate of decomposition of mineral aggregates from atmospheric influences and from culture, such assumptions, and of course their deduced inferences, are merely conjectural. The farmer has enough to contend with in varying seasons, the depredations of insects, &c. without basing his practice upon conjecture.

7. Assuming that we could obtain a fair average of a soil from a field, that we could analyze it with accuracy and at little cost, and that we knew the rate at which mineral aggregates would yield up their sources of fertility, would such knowledge assist us in determining how much of the several active ingredients is wanting to render that soil fertile? Can any one presume to assert, in the present state of our knowledge, how much each kind of plant demands to insure its luxuriance or productiveness? From the observed effects of guano, bones, ashes, lime, and green sand, as well as from the analyses of ashes of plants, it is fair to infer that ammonia, phosphoric acid, potassa and lime, possess fertilizing qualities; but the numerical measure of their value is hypothetical, if not conjectural. Much of what we term our knowledge on this subject is an idea floating in the region of hypothesis; and until it alights upon the ground, and can be handled with some degree of certainty by weight and measure, the practical farmer would do well to keep to his well trodden paths of practice, and rather be content with the accumulating experience of practical trials, than depend upon the results of analysis.

When lime is applied to land, why is it that one kind is found to produce much more than another? It is certainly not merely because magnesia is present in larger proportion in one than in another, for by far the greater portion of the lime applied to the soil in the United States contains notable quantities of magnesia. Is it because the land has already been saturated with lime? This has not yet been proved by facts. May it not be that one kind of limestone contains more alkali or phosphoric acid than another, although in exceedingly minute quantities? Their presence in limestones has been only recently demonstrated, and the question cannot therefore be answered positively.—These questions are offered merely to show that we use lime from observation of its value, and not from an absolute knowledge of the cause of its fertilizing effects.

In wood-ash, is it alkali, phosphoric or sulphuric acid, or lime, that constitutes its more active principle? In guano, does ammonia or phosphoric acid give its chief fertilizing character? Does phosphoric acid act without reference to the base with which it is united, whether potassa, lime, magnesia or ammonia? Does sulphuric acid act with greater potence in combination with alkali, or with lime? In general, is it of inferior moment in what combination a so called fertilizing body is employed, or does it always act as a particular compound?

What duty does organic matter perform, and what is its most suitable condition? Does it enter by the rootlets or by the leaves to fulfil its functions in the organized structure? Is it crenic or apocrenic, or humic acid, or, perchance, some condition, as yet unknown to the chemist, that chiefly exerts its beneficial influence upon vegetation?

When these, and numerous other like questions, shall have been answered by a fair union and agreement of sound theory and long practice, then may we hope for numerical data for determining how much of each ingredient is required upon a soil. And when analysis shall become so far perfected as to determine with tolerable precision the quantities of the minute ingredients contained in a soil, then can we apply the required substances by weight and measure, and predict with measurable confidence the results of the application.

Lastly—It will be observed that in the preceding part of these remarks, I have confined myself exclusively to the consideration of the practical uselessness of the analysis of soils at the present time. Can we look forward to a period when such analyses can be performed with such accuracy, expedition, and moderate cost, as to be available to the art of agriculture? I am well satisfied that such an expectation is well founded. Our assay balances can now show the millionth part of the weight placed in them, and may be still further improved. Reasoning from the past, the methods of analysis admit of almost inde-

finite improvement; and it is highly probable that new analytic processes will be devised of much greater power, rapidity and accuracy, than those at present known, because every journal of chemical science conveys to us monthly and even weekly notices of the progress of chemical analysis.

But although soil analyses may not be useful at present to the operative farmer, they may be made available for the advance of scientific agriculture; and for this purpose, the enlightened agriculturist should lend his aid by having analyses of soils most accurately performed—not one or two, but numerous analyses of the same soil under varying conditions. Such investigations, keeping pace with the advance of vegetable physiology, will the sooner tend to deliver husbandry from the thraldom of empiricism, and place it under the dominion of a rational system. Besides the analysis of soils thus performed, the analysis of ashes of plants and of manures, by throwing light on vegetable physiology, will contribute to the progress of rational agriculture. Above all other things, frequent and carefully conducted experiments on manures of known composition, and close and continued observation on their effects on various crops, will accumulate a treasure of experience, from which sound theory will draw her data, and which will then react most beneficially upon the culture of plants. Then may we look for a literal fulfilment of the expression, that "the desert shall blossom as the rose."

Translated for the Southern Planter from the Comptes Rendus.

INFLUENCE OF AMMONIA

ADDED TO AIR UPON THE DEVELOPMENT OF PLANTS.

BY M. VILLE.

On adding ammonia to the air we find the activity of vegetation to be much increased In the proportion of 4·10,000 of the whole air this effect shows itself at the end of eight or ten days, and from this time its intensity steadily augments. The leaves, at first of a pale green, assume a shade more and more deep, until they become nearly black. Their footstalks grow long and straight, and their surfaces large and glossy. At last, when the growth has reached its maturity, we find that the product is much larger than that of the same plants grown in the pure air. This product is at the same time heavier and contains more than *double the amount of nitrogen.*

Thus ammonia added to air produces two effects on vegetation. First, it favors the growth of plants, and second, it renders them more nitroginous.

Thus in an experiment made in 1850, the product in pure air was 64.19 grammes, and that in the air containing ammonia was 110.06 gr. The first contained 1.266 gr. of nitrogen and the second 4 313 gr.

In 1851 the product in the pure air was 68.72 gr. and contained 0.494 gr. of nitrogen. In the ammoniacal air the product was 135.20 gr. and contained 1.501 gr. of nitrogen.

Besides these general effects produced by ammonia there are others of a more variable nature dependent on special conditions, but which are not less interesting. Indeed, by means of this gas we are able, not only to increase the activity of vegetation, but even to modify its progress, to weaken the exercise of certain functions, and to increase, without limit, the development or multiplication of certain organs.

If we expose the plant to the action of the ammonia some months before the time of flowering, its growth is more rapid, but is not accompanied by any disturbance of usual succession of phases in its growth. It often happens, indeed, that plants, which when cultivated in pure air, fail even to produce flowers, when grown in ammoniacal air produce matured fruit. But if we change the conditions of the experiment, if we wait until the plant is on the point of flowering before submitting it to the action of ammonia, the results are entirely different—the stem shoots up and sends out branches in every direction—clothes itself with innumerable leaves, and, if the season is not too far advanced, the flowering, suspended for a while, is resumed, but all the flowers are sterile.

If we make the experiment upon a cereal whose hollow stem does not admit of the production of new branches, the course of the phenomenon is changed. The growth of the stem, crowned with its spike, is arrested, and from the neck of the root, there spring up clusters of stalks which soon overtop the parent stem. In this case, also, the plant bears no fruit.

All these phenomena may be satisfactorily referred to the general laws of physiology. In truth, all organized beings are subject to a law of compensation, which maintains harmony between the functions, and controls the development of the organs. Whenever any organ receives an undue development it is at the expense of some other organ, and if a function exerts too much activity it is always at the expense of some other function. If the organs of growth, that is to say, the stem, the branches and the leaves, are developed beyond a certain limit, it is at the expense of the organs of reproduction. The flowers are sterile and the plant bears no fruit. In the experi-

ment above described the plant was at the moment of flowering exposed to the action of ammoniacal vapors, their influence determined the formation of a certain number of leaves. This sudden formation of new leaves destroyed the equilibrium between the functions of growth and those of reproduction, and caused the former to predominate over the latter.

The action of ammonia does not operate with the same energy in all the stages of the growth of plants. The effects are more marked from the time of germination to that of flowering, than from this last period to the ripening of the fruit. This difference is easily understood.

Up to the time of flowering all the activity of the plant resides in the foliaceous organs. Favorable influences determine the formation of an increased number of leaves, which, being the organs of absorption, add their effect to the cause which has given them birth. *After* the flowering, on the contrary, all the activity of the plant is turned to the organs of reproduction. Part of the leaves wither and fall, and those which remain are far from being as large as the first. The result is that the surface of absorption is diminished. Furthermore, at this stage the plant is near the extreme limit of its development. These two considerations enable us easily to account for the less marked effects that ammonia produces during the second period of the life of plants.

The use of ammonia cannot fail to become common in greenhouses. In an experiment where it was introduced into a greenhouse of Orchideæ it was found to impart an extraordinary activity to their growth. The results obtained under these new conditions are so striking, that the practical question may be regarded as settled.

During the great heat of summer, ammonia may occasion accidents. It would be well, therefore, to suspend its use during the months of June, July and August. Such accidents as have been observed always occurred under the same conditions, and were of a uniform character. They affect chiefly plants whose vegetation is far advanced. The leaves turn yellow, wither and fall, even though the atmosphere may be saturated with moisture; the evil extends to a certain number of leaves at the top, and the plant dies. This effect is the result of a certain failure of equilibrium between the quantity of the elements absorbed by the leaves and the roots. It is through the roots that mineral substances are supplied to plants. If the absorption of these substances goes beyond a certain limit, the plants cannot use all that they receive, and they form a saline efflorescence on the surface of the leaves. If after a heavy rain the weather becomes dry, we observe frequent examples of this sort of efflorescence upon the large leaves of cucurbitacæ (gourds.)

When under different circumstances, the activity of the leaves exceeds that of the roots, the absoption of organic elements becomes predominant. For want of a sufficient supply of mineral matter, these elements cannot be usefully appropriated. Then a remarkable effect is observed, that which the roots cannot yield to the plant it obtains within itself; and there is a reabsorption of the mineral substance of a certain number of leaves. In nature we often see examples of this reabsorption of the older organs to the advantage of those more recently formed. If we break off a plant of purslain when it is in flower and put it on a sheet of paper in the shade, the vegetation continues, the seed forms and ripens. Now in this case the mineral substances contained in the seed could not be derived directly from the soil, but must, therefore, have been drawn from the tissues of the plant itself.

The following conclusions may be drawn from the observations above detailed:

First. In the proportion of 4-10,000 ammonia added to the air imparts to vegetation a remarkable activity.

Second. A given weight of the product thus obtained contains more nitrogen than that of the same plant grown in the pure air.

We may add, that periods may be selected for the use of ammonia in which its influence causes very different effects.

First. If we commence the use of ammonia two or three months before the flowering of the plant, vegetation follows its usual course, and no disturbance takes place in the successive phases of its growth.

Second. If we begin to supply the gas at the moment of flowering, the formation of flowers is arrested or retarded, the plant covers itself with leaves but produces no fruit.

In the above article by M. Ville will be found some facts that are curious and important, whatever may be thought of the hypothesis by which he explains them. We believe that no former experimenter has tried the effect on vegetation of an atmosphere charged with ammonia, and no one has mentioned the important difference in its effects when applied early in the growth of the plant, and when used just before the time of flowering. This difference, if conclusively established, will suggest important practical maxims in regard to the *time* of applying ammoniacal manures.

The various Clubs throughout the State, or any individual quite as well, can render important service in collecting facts in regard to it. Regarding the source of ammonia as less important than the supply, we would suggest the following series of experiments to be tried by as many as choose to undertake it: 200 lbs. of Peruvian guano, as will be seen elsewhere in this paper, contain 34 lbs. of ammonia,

which is, therefore, a fair allowance for an acre of ordinary land. But in 107 lbs. of sal ammoniac there is just about the same quantity of ammonia, which, applied in solution, should give, so far as the ammonia is concerned, the same results as the guano. We cannot state precisely what should be the strength of the solution, but at the rate of diluting guano, which is five gallons of water to the pound, it ought to have something less than six gallons to three ounces, or about thirty gallons to the pound. Or, perhaps, a better application would be a solution in which an equal quantity of carbonate of ammonia should substitute the sal ammoniac, though that substance costs more and contains rather a less per centage of ammonia.

Let seven equal, separate parcels of corn be set apart in the field as near as may be of uniform quality. (Ten yards by seventy will give just an acre for the seven.) To one of these let the solutions at the rate above given, say 15½ lbs. to 465 gallons of water, be applied at an early period in the growth of the corn; to the 2d the same quantity just before silking; to the 3d, after the grain has begun to form, say just before it comes into roasting ear; to the 4th nothing; to the 5th, when it has come into roasting ear, and at a still later period in the ripening, when the corn is losing its milkiness, for instance; to the 6th let pure water be applied; and to the 7th, nothing. Let the whole in all other respects, be treated in the same way, be weighed when shucked out, and weighed again when dry and shelled; and then let the full result be reported to the State Agricultural Society or to this journal. If several gentlemen will devote to such a series of experiments only one acre each, and a little time, and money enough to purchase sixty pounds of crude sal ammoniac, or its equivalent in carbonate of ammonia, we can assure them that they will render valuable service to the cause of agricultural science.

It is very true that neither class of experiments will come precisely within the terms of M. Ville's; for, supposing the plants to appropriate the ammonia, in the one case we shall have muriatic acid and in the other carbonic acid liberated by the process of decomposition, and each of these exerts a specific effect on vegetation. And in either case the ammonia is supplied in solution, through the soil, to the roots, and not, as in M. Ville's experiments, directly to the absorbents through the medium of a highly *ammonialized* atmosphere. But in practice we imagine that this can make no difference, as there being no practical mode, so far as we know, of charging the atmosphere with ammonia, it must, when sought to be applied on a large scale, be derived from highly concentrated manures, whether in solution or otherwise. In advising these experiments we beg it to be understood that our object is truth, and not the obtaining of grand or startling results. They may all fail and yet not affect the principles of science. But if they succeed they will be valuable. For one thing, they will throw light on the question of the best time to apply guano, a question not now by any means understood.

COMMENT ON AN ANALYSIS OF PROFESSOR MAPES'S.

Below will be found a comment from the Pennsylvania Farm Journal upon an analysis of soil made by Professor Mapes. To what the writer states, which, being a mere matter of calculation based on the statements of the analysis, any one can verify for himself, we will briefly add one or two things going to confirm the justness of his criticism.

In Dana's Muck Manual, 3d edition, pp. 40, 41, the reader will find the weight of different kinds of soil, the mode of ascertaining the number of pounds of the whole per acre for any number of inches, and also the number of pounds of any particular element which may be found in it.

The soil that Professor Mapes professes to have analyzed in this instance is a calcareous sand, the weight of which, as given by Dana, is 113 6 lbs. to the cubic foot. This multiplied by 43,560—the number of square feet to an acre, gives the weight for a foot deep, and divided by 2 will show the number of pounds of soil for a depth of six inches. As Professor Mapes fails to state the depth, and we must assume something as the basis of our calculations, we take six inches, which is perfectly fair to him and justified by his own directions elsewhere given. By the above calculation the weight of soil is 2,474,208 lbs. per acre.

One per cent. of this is 24,742.08.

He gives as the quantity of lime already present .45=45-100 of 1 per cent.=11,133.90 lbs. quicklime or 19,880.30 lbs. carbonate of lime, or 146 bushels of quick, equal to 261 bushels carbonate of, lime. But he requires an addition of 3 per cent. or 74,226 lbs. quicklime=132.535 lbs. carbonate lime=1744 bus., worth, at 10 cents, $174 40 per acre. This assumes the weight of lime at 76 lbs. per bushel.

He further states the quantity of phosphoric acid already present to be .05, or 1-20 of 1 per cent.=1237.10 lbs. which would require 2565.3 lbs. phosphate of lime, or 4500 lbs. (83 bushels of 54 lbs. each) of bone dust. To which he requires to be added 5 per cent. of phosphoric acid=123710 lbs.=256.530 lbs. phosphate of lime=450000 lbs. (8.333 bushels) of ground bones, worth in Baltimore, at 50 cents per bushel, $4.166.

Then, finding of the alkalies, potash and soda, only .07, or 7-10 of 1 per cent.=1731.94 lbs. he requires the further amount of 3 per cent. of potash and 4 per cent. of soda=5 per cent. of carbonate of potash + 7 per cent. of carbonate of soda, or 12 per cent. of these mixed carbonates of the alkalies=296.904 lbs. being a greater per centage than is found in oak ashes, (which is only 11 per cent.) and almost as much as there is in beech ash, (which is 15 per cent.) A bushel of unleached ashes weighs about 44 lbs. and at 11 per cent. will yield 4 84 lbs. of alkalies, at which rate to get the required amount of alkalies according to this analysis, one must apply 61.344 bushels, worth, at 10 cents per bushel, $6,134.

We have then for the whole expense of improving an acre of this soil, according to the analysis given—

For lime, - - - - - -	$174 40
For phosphoric acid, in the shape of bones, - - - - - -	4,166 00
For alkalies, potash and soda, in the shape of ashes, - - - -	6,134 00
	$10,474 40
To which must be added the Professor's very moderate fee for analysis, - - - - -	5 00
	$10,479 40

In fact, supposing such a soil to exist, the best thing to do with it would be to drip it as you drip ashes, for the lye, and then sell the residuum for the bone earth it contains.

Some idea may be formed of the merits of this very remarkable analysis if the reader will turn to page 60 of Norton's Elements of Scientific Agriculture. He will there see in a table representing the composition of certain soils that 2-100 per cent. or 1-50 of 1 per cent. of potash, 4-100 per cent. or 1-25 of 1 per cent. of soda and a like quantity of phosphoric acid are the ingredients of a permanently fertile soil.

The reader will not, of course, expect to see the learned Professor recommend the quantities of these ingredients that his analysis requires. He contents himself with advising the application of a much more moderate amount. Why there is inconsistency between his science and his practice is for himself to explain. For the present we dismiss the subject.

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I have often remarked with what seeming confidence some of the learned gentlemen who undertake to analyze a sample of soil for the sum of five dollars, to be paid by a confiding farmer, report the result of their labors, and then vouchsafe to give their advice founded on the analysis. In the April number of 1852, of the Working Farmer, is contained one of those singular productions from the pen of Professor J. J. Mapes.

The learned Professor first states the result of the analysis as follows:

"*Mr. ———, Warren, Somerset Co., N. J.*

Dear Sir,—The following is an analysis of your soil, made by Mr. W. H. Bradley, as per column No. 1. The necessary amendments are given under No. 2.

Analysis.	*No.* 1.	*No.* 2.
Organic matter, - - -	.60	10.
Silica, - - -	87.12	
Alumina, - - -	8 35	
Iron and manganese, -	2.10	
Lime, - - - - -	.45	3.
Magnesia, - - -	trace.	
Sulphuric acid, - -	.25	2.
Phosphoric acid, - -	.05	5.
Chlorine, - - -	——	2.
Potash, } - - -	.07	3.
Soda, }		4.
Carbonic acid, - -	.81	

You will perceive by the above that your soil is deficient of

1. Organic matter, 4. Phosphoric acid,
2. Lime, 5. Chlorine,
3. Sulphuric acid, 6. Soda,
7. Potash."

If we assume that an acre of ground contains 30,172 bushels of soil, each bushel weighing 90 lbs. we will have 2,715,480 lbs. of soil, and if it contains 45-100 of lime, we will have 12,200 lbs. of lime to the acre, (equal to 160 bushels.) But we see by the second column,

that the learned Professor has set down the required amount at 3 per cent.—or in other words, at 81,464 lbs. We then must supply 69,264 lbs. which would be no less than 1086 bushels of lime.

Experience has taught the farmer that a dose of fifty bushels of lime will be a sufficient dressing for almost any land. If such is the case, this soil already contains more than three times the required amount. By the analysis, this soil contains 162 bushels to the acre, and yet the learned Professor says that lime is deficient.

The reader will perceive that no care has been taken, in making this analysis, to ascertain in what state this 162 bushels of lime already in the soil existed. No attention is paid to its state of combination. We have carbonic acid, .81, more than enough to saturate the whole of it. If this lime was then a carbonate, surely any small addition such as is usually made, would not be of much utility. But herein is the difficulty. These examinations, (for I will not dignify it by the name of an analysis, when any gentleman devotes no more than five dollars' worth of time and labor to it,) are entirely useless, and only calculated to lead persons into error. If the reader will add up the sum of the constituents, he will find that they produce 99.80, and that the learned gentleman reports to have found a trace of magnesia. This latter is to account for the 20-100 missing in the sum total. The operator must have acquired an extraordinary degree of exactitude in his chemical manipulations, to have been able to arrive at such a result, without compiling it from many trials, and averaging the errors. But at five dollars no man can make the salt that it would take to his bread, even to make one analysis of a soil, much less to make twenty, and by averaging the differences, be able to bring it out like a balance sheet, with nothing carried to profit and loss. To ascertain any proportion below 1-100, requires the most delicate kind of manipulation, and is attended with much labor, and can only be relied on when repeated trials have been made.

If the 162 bushels of lime already in this soil are insufficient, it is not because that amount of lime would not answer the purposes of agriculture, but because the lime was in combination with something that hindered it from subserving the purposes which I have already laid down in a former article. The gentleman who so positively lays down that it is deficient in lime, does not appear to have taken any of these matters into consideration. If I am correct in my views, the soil may require lime, notwithstanding the presence of even 3-100, provided such lime is combined so as to render it useless to the soil. But much less than one-half of one per cent. of lime combined with carbonic acid will be found to be sufficient. As to any man under the advice of a consulting agricultural chemist, being induced to put lime enough on his land to bring it to 3-100, I have nought to say, but that in my neighborhood it would make quite a sensation.

Some of the most fertile alluvial land in Ohio contains but a shade over one-half of one per cent. of lime, but this lime is a carbonate.

G. Blight Brown.

A CHALLENGE.

Mr. C. H. M'Cormick wishes us to publish the following challenge to Mr. Booth of Nottoway:

"I now propose to have a trial of the machines, (M'Cormick's and Hussey's Reapers,) at the commencement of the late harvest of the next harvest at ———, (on James river,) to last for two entire days, and to be tested in cutting wheat with the morning dew on it, and also in cutting clover or other grass, by a committee of seven men, six of whom shall never have used either machine; said committee to be selected by the company who may be present on the occasion, or in any other fair manner. And I further propose that Mr. Booth and myself shall each stake five hundred dollars on the result, the money of the party having the machine adjudged best for practical purposes, every thing considered, by a majority of the committee to be returned to him, and the money of the beaten party to be paid over to and for the benefit of the Virginia State Agricultural Society. Any communication in relation to carrying out this proposition addressed to me at Chicago, Illinois, will receive prompt attention.

C. H. M'Cormick."

As Mr. Booth's challenge to cut, or rather his proposition for a trial on his own ample fields, was first made and was immediately accepted by Mr. Hussey, and was most probably known to Mr. M'Cormick at the time he made the above banter, we presume he will not feel bound to take it up, but will, on the contrary, adhere to his own offer. We see nothing unreasonable in his doing so, and as Mr. M'Cormick desires a trial, and can have it just as well in Nottoway as elsewhere, we see no reason for his meeting one challenge with another instead of accepting it at once.

The proposal to put up money on the issue, we presume Mr. Booth will not meet. We take it for granted, that, like a sensible man, he thinks bets prove nothing, and that in this instance they will only increase existing irritations. And were his sentiments different, we presume he would not stake money on an

opinion by which he cannot make money. He is a gentleman farmer, entirely indifferent either to Mr. Hussey or Mr. M'Cormick; and, in pursuit of the best machine, would not care a button which got the award, so it was fairly made. Regarding Hussey's machine as the best, he still thinks it may be improved upon, and if M'Cormick's can be made to do better work, he is prepared to purchase and recommend it.

PURE SOUTHDOWN BUCK.

We have been occasionally asked why we do not insert cuts of animals in the Planter, and we have generally given two good reasons for our apparent delinquency: 1st, The cost of getting originals, which the niggard support we receive will not allow the proprietor to encounter; and 2d, The general inferiority of such engravings, scarcely one in a thousand being worth the paper they spoil. The outline of a horse, a cow, a sheep or a hog is pretty near an imaginary parallelogram, a figure frequently used in aiding writers to give their readers just ideas as to the proportions of particular animals; and it is directed that in order to obtain a competent skill in judging them we should apply this imaginary outline, (varied more or less from a square, according to the kind of animal subjected to the test,) and the nearer the given object comes to filling it, the more symmetrical is it decided to be. Now we rarely ever see a portrait of a stallion, bull, boar or ram, in which it is not evident that the unfaithful or unskilful artist has filled up this parallelogram with the body, leaving the head and neck to be supplied afterwards by his own fancy, or by a bungling effort at a flattered likeness. Sometimes this is done to deceive, sometimes not. In the one case we have a humbug; in the other a caricature; and in both the effect is to impose on those who rely upon such pictures as standards of correct form. As then they are not instructive, nor, in our view, ornamental, we shall decline to insert them, *on our own responsibility*, except when they are really a portrait, or a credit to the artist.

In fact it is a difficult thing to take portraits of animals. The expression in their ordinary placid moods depends as much on the figure as on the countenance, and is harder to catch because the individuality is more obscure, and there is not much in it that is striking, except to the nicest and most practised observation—like the face of an infant, which, however bright in flesh and blood, is very apt to have a vacant look when transferred to canvass by an ordinary painter. The engravings which we see in English periodicals are, to be sure, vastly superior to our own, but theirs is not so much the merit of fidelity as of execution. There has been but one man within the last century, if our memory serves us, who has excelled in this department of art; and it will probably be a long time before another shall arise to contest the palm with Edwin Landseer.

But in one way these portraits can be easily supplied, and that is by Daguerreotype. Once obtained in that way they can be copied without difficulty by a man who could never take a likeness. We have invited several persons, among them our friends, R. L. Wright of Loudoun and Dr. J. R. Woods of Albemarle, who have model hogs, and fine animals of other sorts, to pursue this plan and give us portraits for the Planter, and we yet hope they will do it.

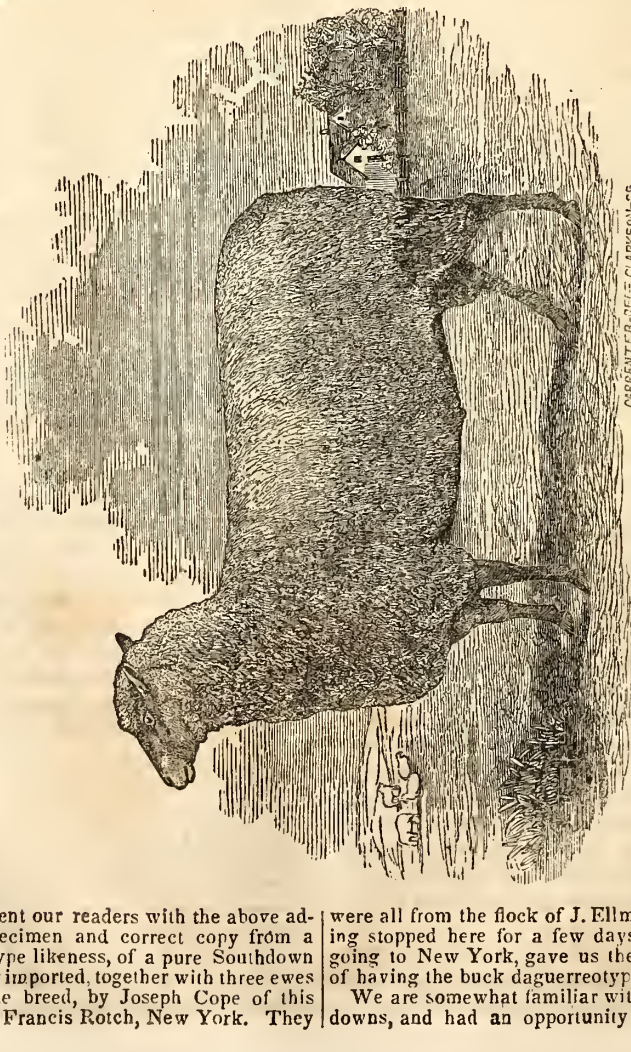
Of this order is the portrait of the Pure Southdown Buck which we herewith offer to the criticism of our readers. It is evidently a first rate likeness, but whether of a first rate sheep or not does not appear, and cannot, from the attitude, which presents a side view. To be judged correctly, a sheep must be looked at behind and before; for breadth of back, fulness of rump and breast and a general roundness of carcass are the points of high form in a mutton sheep. We do not doubt that he *is* first rate, from his "antecedents," as the politicians say, and we do not find fault with the portrait for not informing us on this point. It is impossible it should have done so.

We were so much impressed with its merits at first sight that we immediately wrote to the Editor of the Pennsylvania Farm Journal, in which paper it first appeared, and proposed to purchase the cut. This he declined, but very generously tendered us the use of it; and we eagerly accepted the proffer, because we wished, first, to exhibit to our readers a good portrait of an animal; and second, to show them what a genuine Southdown looked like, that breed

being, in our estimation, the mutton sheep of the world, and of Virginia in particular.

Those who desire to get a closer view of this breed we invite to accompany us in a call on Raleigh Colston, Esq. of Albemarle, who has the finest flock in Virginia, seven-eighths bred, which is much above the average purity of northern flocks. And if any gentleman desires a ram we advise him to engage one of Mr. Colston, and to do it at once, or he will be too late, as he castrates all that are not engaged. There is as much jockeying in sheep, particularly at the north, as is in horses, and in that view, if in no other, it is something to deal with a gentleman. Buyers need not object to one-eighth of cross blood, as like all distinct strains, the characteristics of the breed are impressed very strongly upon the offspring. But those who prefer the pure blood can get it of Mr. Rotch, provided they employ an agent to make the purchase on the spot. For he, with a delicacy that redounds to his honor, always refuses to select for an absent and unknown purchaser.

PURE SOUTHDOWN BUCK.



OWNED BY FRANCIS ROTCH, MORRIS, OTSEGO COUNTY, NEW YORK.

We present our readers with the above admirable specimen and correct copy from a daguerreotype likeness, of a pure Southdown buck, lately imported, together with three ewes of the same breed, by Joseph Cope of this county, for Francis Rotch, New York. They were all from the flock of J. Ellman, and having stopped here for a few days, previous to going to New York, gave us the opportunity of having the buck daguerreotyped.

We are somewhat familiar with fine Southdowns, and had an opportunity some years

ago, at the great Southampton cattle show in England, to examine some of their best specimens, but we have not the impression of ever seeing a more finished sheep in all the characteristic points of the Southdown breed, than the buck now before us. The engraving we consider the best *unflattered portrait* of a pure Southdown which has appeared in any periodical in this country.

Our friend, F. Rotch, in a letter to us, from which he has permitted us to make some extracts, says: "As you have seen the sheep sent me by Mr. Ellman, any comment on my part is unnecessary. I requested him to send me specimens of his very best sheep, and I have reason to believe that as a matter of *friendship* he has done so, and I feel under great obligations to him for thus according to me what money alone could not have procured. I have seen larger sheep, but I think I have never seen more beautiful or more finished specimens of the breed. As Mr. Ellman remarks, I have yet to learn that size, accompanied by coarseness, is a characteristic of a true Southdown." These sheep, on the voyage, were accompanied by an English shepherd, through whose care they arrived in fine condition. In importations of sheep especially, this is the only safe plan, and is the cheapest in the end. It is useless to purchase abroad high priced stock, if they are to have only *chance* attendance and feeding during the voyage. We lost some a few years ago, who died on the passage, which also happened to some of the large Oxfordshire sheep, imported by Messrs. Reybolds.

This importation of Downs, selected, as they have been, with so much care, we consider quite an acquisition to the country.—*Ed. Pennsylvania Farm Journal.*

We invite the attention of our readers to Mr. L. G. Morris' advertisement of Pure Bred Male Stock, at private sale. After the 15th instant, catalogues with full description, pedigrees, prices, &c. can be had by applying at this office, south 12th street.

We heard of a mode of raising melons a short time ago, which is said to be very successful. It is this: About a month before the usual time of planting, take a large turnip and scoop it out so as to make a cavity, say, half the size of the turnip, fill this with rich soil, plant the melon seed in it, and set it in a warm place—a south window, for instance. The seed will germinate and the plant grow until the danger of frost is past, and the vine is beyond the reach of fly. Then bring the turnip where you wish the vine to grow, and it is said fine melons may thus be raised a month earlier than in the ordinary way.—*Charlottesville Advocate.*

PAYMENTS TO THE SOUTHERN PLANTER,

From 1st to 15th March, 1853.

H. L. Plummer to January 1854	$1 00
John Crank (in full) to October 1852	3 75
P. C. L. Burwell to January 1854	1 00
Benj. M. Jones to January 1854	8 00
Wilson P. Bryant to January 1854	1 00
Henry M. Baker to March 1854	1 00
Francis Preston to July 1854	1 00
Nelson W. Crisler to January 1854	1 00
Joseph Mann to January 1854	1 00
Paul T. Woodward to January 1853	5 00
R. C. Miller to January 1854	1 00
Peter Boisseau to January 1854	1 00
Maj. D. G. Lang to January 1854	1 00
Wm. C. Menniss to January 1854	1 00
Dr. H. C. Worsham to January 1854	1 00
P. C. Massie to January 1854	1 00
H. H. House to January 1854	
Wm. Fleming to January 1854	
Calvin Waller to January 1854	5 00
John Nance to January 1854	
William B. Wortham to January 1854	
A. H. Cook to January 1854	
J. L. Brooke to January 1854	1 00
Gen. S. F. Patterson to January 1854	1 00
J. C. Norwood to January, 1854	1 00
Launcelot Burruss to January 1854	1 00
Wm. E. Martin to January 1855	2 00
John P. Stevens to January 1854	1 00
Archibald Pointer to January 1854	1 00
R. C. Dickinson to January 1855	2 00
Bladen Weir to January 1852	2 00
Wm. J. Weir to January 1854	1 00
Jesse Smith to January 1854	1 00
Col. Wm. Simmons to January 1854	1 00
Dr. A. Bryant to January 1854	1 00
Wm. Smith to January 1854	1 00
John F. Harper to May 1854	1 00
Edward C. Turner to January 1854	1 00
James Skinner to July 1853	1 00
W. R. Bland to January 1854	1 00
H. C. Watkins to January 1854	1 00
W. W. Hancock to January 1854	1 00
Dr. R. H. Nelson to January 1854	1 00
Rev. J. Shough to January 1854	1 00
J. S. Nicholas to January 1854	1 00
J. Clayton to March 1854	1 00
N. Birdsong to March 1854	1 00
C. R. Christopher to March 1854	1 00
R. F. Pritchett to March 1854	1 00
E. B. Jones to January 1854	1 00
John Tyler to January 1854	1 00
Richard Sampson to January 1855	3 00
Joseph H. Skelton to January 1854	1 00
Leedy Cawthorn to January 1854	1 00
E. H. Flournoy to March 1854	1 00
John H. Steger to January 1854	1 00
W. W. Harris to January 1854	1 00
Col. Trevillian to January 1854	8 00
Capt. Wm Kidd to January 1854	1 00
J. B. Sinclair to January 1854	1 00
Dr. Wm. T. Minor to January 1854	1 00
Wm. Webb to January 1854	1 00
Dr. Wm. L. Powell to January 1854	1 00

T. J. Garden to January 1854	$1 00
Capt. Wm. Bacon to January 1854	1 00
John H. Bousack to January 1854	1 00
Wm. Wertenbaker to January 1854	1 00
D. D. Wimberleys to January 1850	2 00
Britton Howell to January 1853	2 00
A. B. Puller to January 1853	2 00
John A. Harman to January 1854	1 00
Michael G. Harman to January 1854	1 00
John S. Moon to July 1855	3 00
Wm. C. Duke to March 1854	1 00
Wm H. Hening to January 1854	1 00
John D. Moon, Sr. to January 1853	1 00
Robert Beverly to January 1854	
W. C. Jeffress " "	
E. T. Jeffress " "	
S. H Pettus " "	5 00
Richard Irby to July 1854	
E. F. Williamson to January 1854	
E. C. Wingfield to July 1853	1 00
George W. Stark to July 1853	1 00
J. W. Woods to January 1854	1 00
E. B. Brown to July 1854	2 00
Charles P. Rodes to January 1854	1 00
George H. Geiger to July 1853	1 00
Wm. Johnson to January 1854	1 00
Anderson White to January 1854	1 00
S. W. Martin to January 1854	1 00
W. S. Dabney to January 1854	1 00
J. W. Dabney to January 1854	1 00
Wm. Munford to January 1853	1 00
L. W. Robinson to October 1853	1 00
J. R. Vest to July 1852	1 00
Wm. H. Turner to January 1854	1 00
S. M. Teel to January 1854	1 00
J. T. Sherman to January 1854	1 00
Thos. M. Stubblefield to January 1854	1 00
Col. Charles Blue to January 1854	1 00
Col. Thos. Carskadon to January 1854	1 00
Robert Carmichael to January 1854	1 00
Capt. D. Pugh to January 1854	1 00
John Chandler to January 1854	1 00
M. H. Moore to January 1854	1 00
Robert Collins to January 1854	2 00
James C. Gates to January 1854	1 00
J. J. Ambler to September 1853	1 00
John W. Hurt to January 1854	1 00
R. H. Styll to January 1854	1 00
Moses G. Hendrick to January 1854	1 00
Giles Sydnor to April 1854	1 00
Joseph J. Camden to January 1854	1 00
James C. Hart to January 1854	1 00
Robert Pollard to January 1855	2 00
J. F. Claiborne to January 1854	1 00
P. Fowlkes to January 1854	1 00
Dr. P. H. Anderson to January 1854	1 00
D. E. Jiggetts to January 1854	1 00
John Orgain to January 1854	7 00
Rev. D. M. Wharton to January 1854	2 00
John S. Fleming to January 1854	1 00
Col. Jacob Sincindiver to March 1854	
Samuel McKown " "	
James Hayslett " "	
John Bell " "	5 00
George Pitzer " "	
Levi Henshaw " "	
W. Y. Hiter to January 1854	1 00

AGENCY.

I AM willing to assist gentlemen in purchasing and selling farms, stock, and poultry of every description; to attend to receiving and properly forwarding animals; also, to procure suitable overseers and laboring men for farmers and planters: all of which will be attended to for a small commission. My position as Marshal of the Maryland State Agricultural Society gives me advantages of knowing many men, and most good stock, which with my general knowledge of land induces me to extend the agency to land, men and stock. I have some fine farms to sell in Talbot county, and several in Baltimore county: subject to my order a number of prize animals, saddle and other stallions, and a few fine mares; Durhams, Devons, Alderney, and Ayrshire; pure long wooled sheep from the best flock in the United States; Chester and Suffolk pigs; Shanghai and other new and large fowls; also, two fine Jacks. All letters post paid, will receive prompt attention.

MARTIN GOLDSBOROUGH.
Harrisonville, Baltimore Co., Md.

Refer to

C. B. Calvert & C. Hill, Washington City; G. W. Hughs, West River, Md; J. N. Goldsborough, Easton, Md.; R. McHenery, Emerton, Md.; S. G. Fisher, Philada., Pa.; C. P. Holcomb, Wilmington, Del.; Col. J. W. Ware, Berryville, Va.; I. G. Wright, Wilmington, N. Carolina; J. W. H. Brownfield, Charleston, S. C.; McGill Robinson, Louisville, Ky.; Wm. A. Lake, Vicksbnrg, Miss.; Dr. Henry M. Robinson, Huntsville, Ala.; T. Hayward and Maj. R. Hayward, Tallahassee, Florida.

mar—tf

IMPROVED SHORT-HORN (Durham) CATTLE FOR SALE.

CALVES, three-fourths or seven-eighths blood, of this stock, may be bought of me at $15, if taken at weaning time. If a male is wanted, it will be necessary to engage him in advance.

Good cows, with young calves of like blood, not weaned, may now be bought, for prices varying from $55 to $65, for each cow with her calf.

My cattle are descended from Berry, imported by Edwin G. Booth, esq. of Nottoway, and bought for him by the Rev. Henry Berry. This gentleman, esteemed one of the best judges and breeders of cattle in England, selected this as the best calf he knew, and of the best family of "Improved Short-Horns." (Mr. Berry's letter containing that statement was published in the Farmers' Register, vol. V, page 383.) Some years after, I and others bought the bull for $400. My present bull is by Berry, and from a cow also of the same pure blood, but of different descent from the original English stock of "Improved Short-Horns." EDMUND RUFFIN.

Marlbourne, (near Old Church P. O.) mar—2t

THOROUGH-BRED DEVONS for Sale by W. P. & C. S. WAINWRIGHT.

BULLS.—1. *Uncas:*—calved March 19th, 1851.—1st prize as yearling at American Institute show in October, 1852. Sire, "Megunticook;" grandsire, "Prince Albert" (102): dam, "Nonpareille," by "Lord Lynedock."

2. *Red-jacket:*—calved May 5th, 1852.—1st prize as calf at American Institute show 1852. Sire, "Megunticook:" dam, "Meadow Lilly," by "Baronet" (6); g. d. "Helena."

3. *Osceola:*—calved Sept. 11th, 1852—Sire, "May-boy" (71); grandsire, "Duke of York" (37); dam, "Moss-rose," by "Duke of York," (37); g. d. "Nonpareille."

4. *Dacotah:*—calved October 29th, 1852.—Sire, "May-boy," (71); dam, "Red-bud," by "Megunticook;" g. dam, "Nonpareille," by "Lord Lynedock."

HEIFERS.—1. *Rose:*—calved Oct'r, 1849; bred by Mr. R. C. Gapper, Canada West.—Sire, "Major;" g. sire, "Billy;" dam, "Cherry," by "Billy;" g. d. "Beauty." In calf by "May-boy."

2. *Gazelle:*—calved October, 1850; bred by Mr. R. C. Gapper, Canada West.—Sire, "Rob Roy;" grandsire, "Santa Anna;" dam, "Cherry." In calf by "May-boy," (71.)

These pedigrees run back to the best herds in England:—"Megunticook," "May-boy," and "Nonpareille," having been imported from the stock of George Turner, Esq., and "Helena," from that of James Quartly, Esq., by ourselves; while "Billy" and "Beauty" were imported by Mr. Gapper from that of Mr. James Davy.

Animals delivered free of expense in New York, or Albany. Our stock may be seen at all times on our farm, three hours from New York by Hudson River R. R.

The numbers in brackets refer to the English Herd Book.

Rhinebeck, Dutchess Co., N. Y. mar—3t

PURE BRED MALE STOCK

At Private Sale at Mount Fordham, Westchester County, 11 miles from City Hall, New York.

I WILL sell and let from 10 to 12 Short Horned Bulls and Bull Calves, 4 Devon Bulls and Bull Calves, and from 12 to 15 Southdown Rams. The annual sale by auction will be omitted this year, as I wish to reserve all the females, having recently purchased another farm to enable me to increase my breeding establishment. My Hog stock, including all the spring litters, are engaged. Catalogues, with full description and pedigrees of above Bulls and Southdown Rams, with the prices attached, can be obtained by the 15th April inst., from the subscriber or at any of the principal Agricultural Stores, or from the Editors of the principal Agricultural Journals. L. G. MORRIS.

April 1, 1853—3t

NOTICE.

To those who have recently subscribed for the PLANTER, and requested us to send the back numbers from January, 1853, we are sorry to say, it is out of our power to do so. The back numbers (January, February and March) are entirely exhausted.

CONTENTS OF NUMBER IV.